Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

August, 1935

NRA U.S. CODE GRAPHIC ARTS INDUSTRY 1934

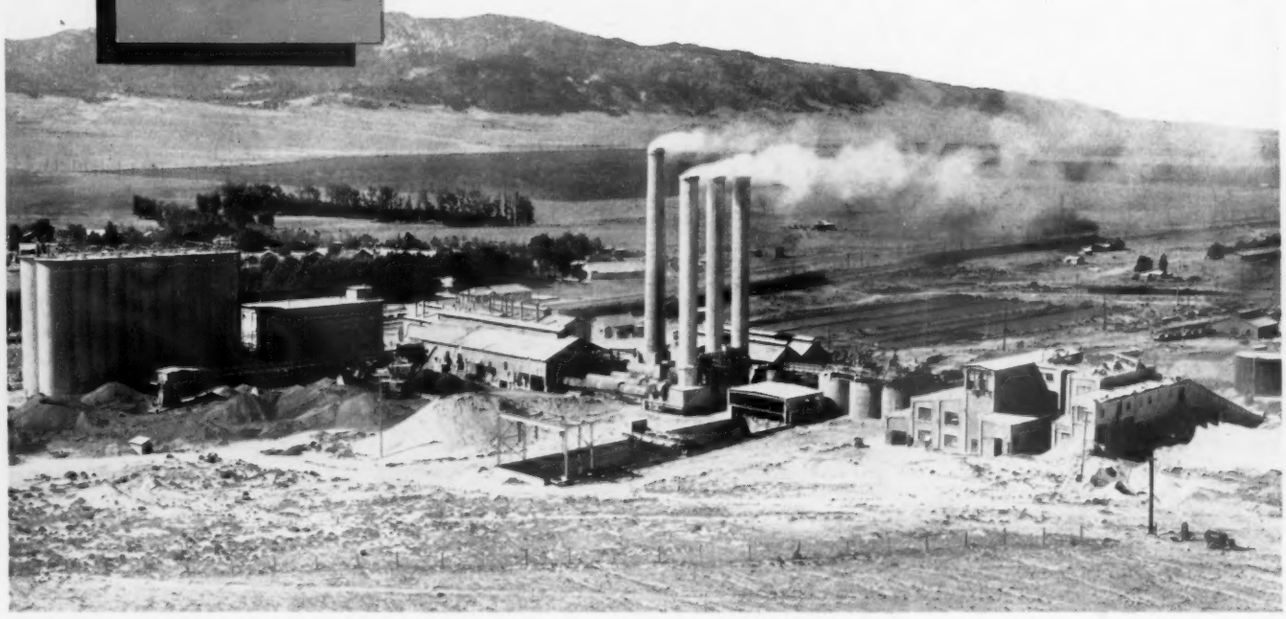
IN 6 MONTHS

HALAFAX EXPLOSIVES

the newest of commercial blasting agents

● INTRODUCED ● PROVED ● ACCEPTED

BY LEADING PRODUCERS OF ROCK PRODUCTS



Illustrated is one of the mills of the Monolith Portland Cement Co. near Monolith, Calif. Monolith, a leader in the Industry, is this year consistently using Halafax Explosives in all its quarrying operations.

Halafax accomplishments and Halafax economy, substantial reasons for acceptance by leaders in the Industry, are due primarily to these three factors: Halafax contains chlorate of potash. Halafax is 20% lighter in weight than other explosives yet — the price per pound is the same. Halafax is free from separation and deterioriation. Result: Halafax Explosives break more ground per pound of powder.

Add these important features: CHEMICAL STABILITY — no leaking fluids, no bleeding, no creeping or separation in storage; PHYSICAL STABILITY — no change in consistency or efficiency due to temperature conditions; uniform composition in every cartridge; HANDLING — no nausea to personnel handling the explosives; available in standard sticks 20 strength and up; also in free flow form.

The story of Halafax Explosives is available in booklet form — "What is Halafax?". It details facts that not only are interesting, but important to you. Your request for copies will receive prompt attention.

HALAFAX EXPLOSIVES

HALAFAX EXPLOSIVES CO.

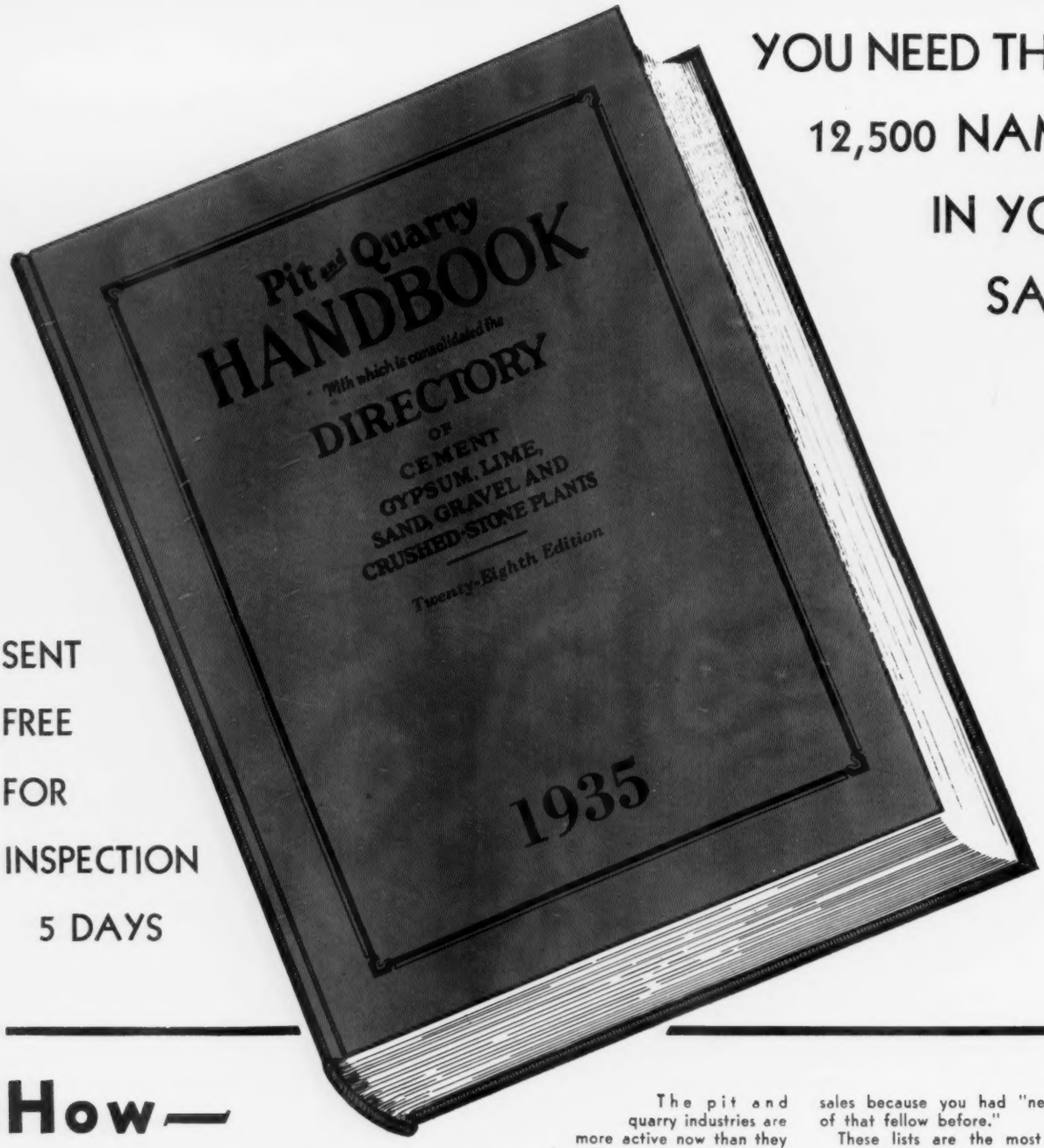
EXECUTIVE OFFICES: 810 South Spring Street, Los Angeles, California

PLANT AND MAGAZINE: Saugus, California

Pages 17-21

Since 1929 the largest net paid A. B. C. producer circulation in the field

YOU NEED THESE 12,500 NAMES IN YOUR SALES KIT



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How—

—accurate and complete are your prospect lists?
—much "deadwood" is there on your prospect lists?
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—much do you waste per year on poor lists?
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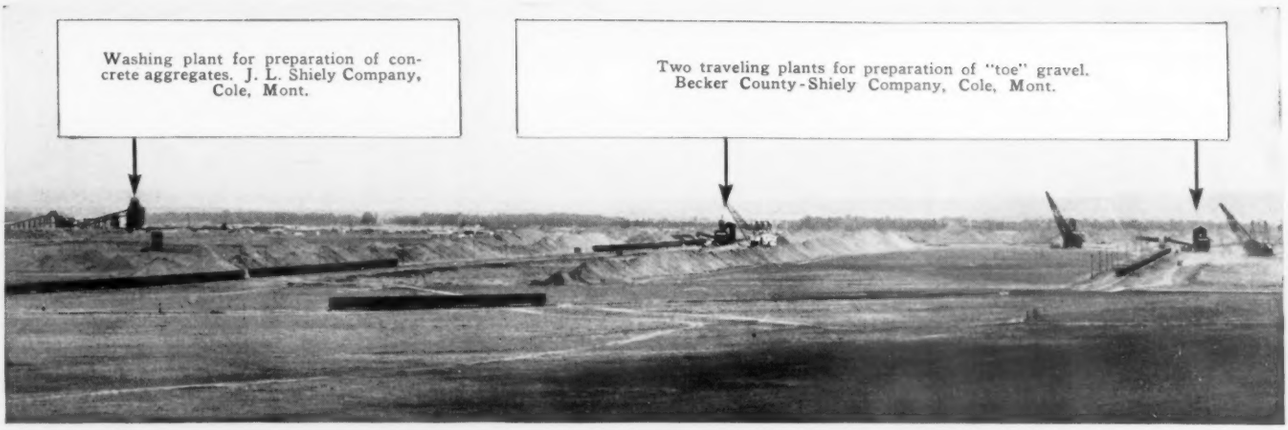
Washing plant for preparation of concrete aggregates. J. L. Shiely Company, Cole, Mont.
Two traveling plants for preparation of "toe" gravel. Becker County-Shiely Company, Cole, Mont.

3 LINK-BELT PLANTS Producing Material for Fort Peck Dam

One of the two Link-Belt traveling plants owned by Becker County-Shiely Company, Cole, Montana. These plants produce, and load into cars "toe" gravel for the Fort Peck Dam. The sand is screened out and returned to pit, the oversize being delivered to trucks for disposal.

TWO of these plants are of the traveling type mounted on car wheels and operating on wide gauge tracks. They are owned by the Becker County-Shiely Company, and operate at Cole, Montana, producing "toe" gravel for the toe or bottom of the slope of this earth-filled dam. The stationary plant also located at Cole, is owned by J. L. Shiely Company and produces washed and screened sand and gravel for concrete tunnel lining, retaining walls, spill-ways, etc. Send for book No. 1240.

LINK-BELT COMPANY 5401

The Leading Manufacturer of
Equipment for Handling Materials and Transmitting Power
PHILADELPHIA . CHICAGO . INDIANAPOLIS . ATLANTA
SAN FRANCISCO . TORONTO Offices in Principal Cities

Stationary plant owned by J. L. Shiely Company at Cole, Montana, which produces sand and gravel for Fort Peck Dam.

AFR -1 1936

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Pit and Quarry

With which is consolidated
CEMENT-MILL & QUARRY

Volume 28 AUGUST, 1935 Number 2

MEMBER AUDIT BUREAU OF CIRCULATIONS

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NRA U.S. CODE GRAPHIC ARTS INDUSTRY 1934

BETTER FOR DUMP TRUCKS?

Of course! Here's why—

Here's a tire that will do your work better. It's the Goodyear Dump Truck All-Weather—built to do the kind of work your dump trucks do.

Examine it. Try it. Judge it in the light of your own tire requirements. Judge it from the standpoint of performance. Judge it from the angle of long, dependable service. Judge it on the basis of cost-per-mile operation. Judge it any way you like—no other tire can give you so much.

Better for dump trucks? Of course! They're *built* for dump trucks. Goodyear Dump Truck All-Weathers give you:

- **BETTER TRACTION**—the grip and pulling power of that famous All-Weather tread . . . the tread that has proved itself in over twenty-five years' service.
- **SIDE-WALL TRACTION**—heavy rubber side-wall ribs for protection and added traction in ruts.
- **GREATER STRENGTH, DURABILITY**—because of Supertwist cord—the best cord ever developed for truck tires.
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Give Goodyear Dump Truck All-Weathers a chance to show you what tire performance really is. Let them prove to you they're MONEY SAVERS.

CALL THIS MAN

He is the Goodyear Truck Tire Man. He represents the most complete line of truck tires made. Behind him are all the years of Goodyear's experience in the design and application of truck tires for every type of business—for every job. He'll pick the RIGHT tires for your trucks. His services cost you nothing. He'll save you money.

SEE THIS TIRE

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money savers

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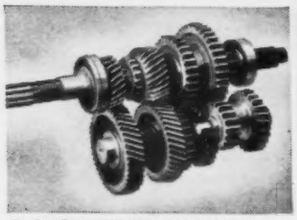
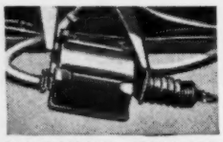
20,000 LBS. GROSS CAPACITY
32,500 LBS. TRAIN WEIGHT
At last Dodge has produced the 3-ton truck heavy-duty haulers have demanded. Priced with the lowest ...famous Dodge features that save you money—an ideal truck for inter-city haulers, warehouse firms, dump truck users and many others.

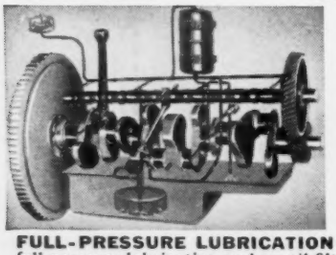
DOZENS OF EXTRA FEATURES THAT CUT COSTS... PROLONG TRUCK LIFE...AT NO EXTRA COST!



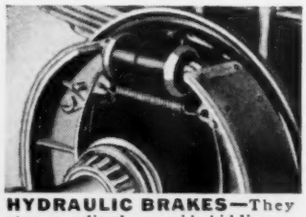
5-SPEED TRANSMISSION—A costly Dodge feature that insures ample power under all load, grade or road conditions. Quiet helical 4th gear like an extra high gear. Makes it easy to maintain maximum road speed.



VACUUM BRAKE BOOSTER—Another high-priced Dodge feature ...gives greater protection to drivers, trucks, loads; makes stops easy. More comfort and ease for the driver. Combined with safe, quick-stopping Dodge hydraulic brakes this finer Dodge feature works daily to save money on tires—brake adjustment, and relining expense.



FULL-PRESSURE LUBRICATION—Dodge gives you full-pressure lubrication and an oil filter ... insures clean oil, free from grit, at every bearing. Saves oil ... cuts repairs ... adds to life of your truck.



HYDRAULIC BRAKES—They stay equalized... avoid skidding... eliminate need for constant readjustment ... save money on tires and brake relinings.

DODGE has pioneered for 18 years in building fine dependable trucks. Now comes this great new 3-ton Dodge. Its low price is a sensation, only $1695* for a 20,000 lbs. gross capacity 3-ton truck! Yet like all other Dodge trucks, it brings you saving features, such as you would expect only on much higher-priced trucks. Such features as a 5-speed transmission for great flexibility with a helical fourth gear capable of sustained, quiet operation—5 piston rings instead of 4 ... to give better compression ... save gas and oil. Hydraulic brakes avoid skidding and swerving ... save money every day on tires, brake adjustments and relining expense.

And these are only a fraction of the finer features Dodge has put on the new Dodge 3-ton truck, to save you money on gas, oil, tires, upkeep ... and to add years to the life of your truck. You have no idea how much value your truck money can buy until you have seen this new 3-ton Dodge. Your local Dodge dealer has complete details and will be glad to quote on a Dodge truck to meet your needs.

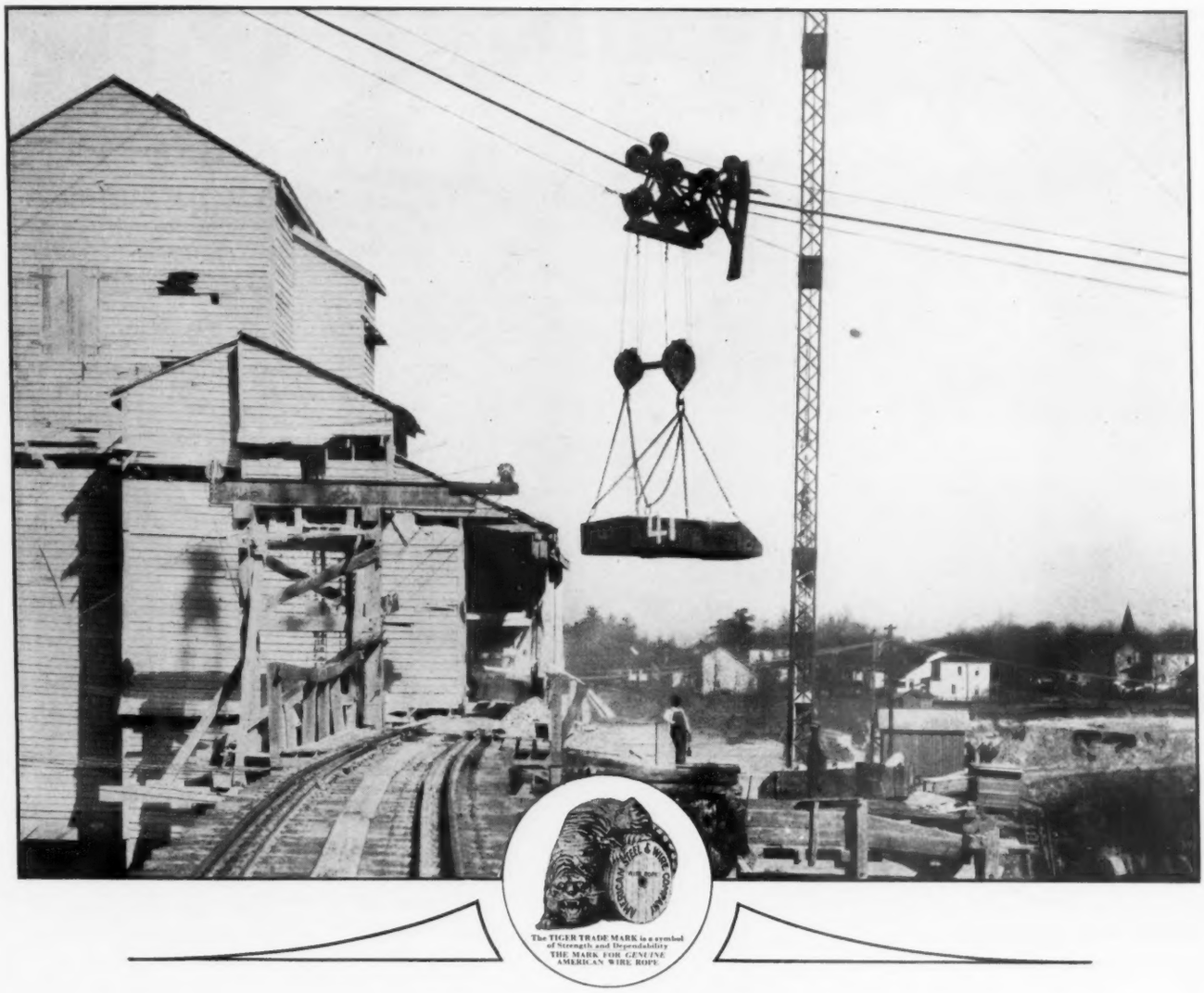
DODGE DIVISION—CHRYSLER MOTORS

**List prices at factory, Detroit, subject to change without notice. Special equipment, including dual wheels on 1½-ton models, extra. Time payments to fit your budget. Ask for the official Chrysler Motors Commercial Credit Plan. (Dodge passenger cars $645* and up.)*

Dependable **DODGE TRUCKS**

½-TON CHASSIS, $365*—1½-TON CHASSIS, $495*—2-TON CHASSIS, $895*—3-TON CHASSIS, $1695*

IN PIT—IN AIR —ON SURFACE—



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The Koehring Dumptor dumps the load *where you want it—right now.* The "tough" spots are as easily and quickly filled as "topping out"—without time-losing "jockeying" or auxiliary equipment.

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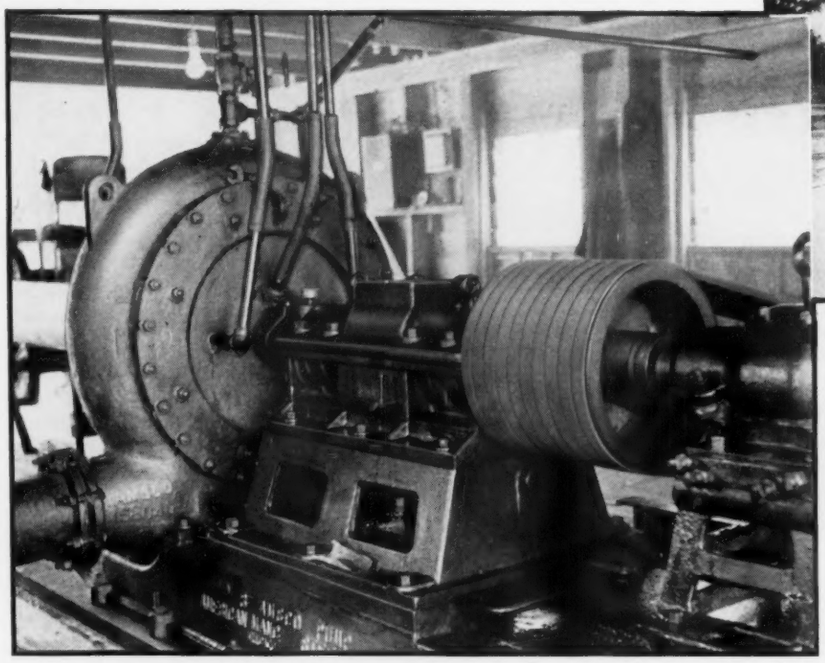
AMSCO SAND AND GRAVEL DREDGE PUMPS



8-inch AMSCO, Type "M", Heavy Duty Sand and Gravel Dredge Pump. Right Hand, Bottom Discharge, equipped with two-way thrust bearing and latest design water end parts incorporating the high efficiency impeller of funnel-mouth construction; "V"-rope drive and powered by a "Caterpillar" Diesel Power Unit. This is the pump used by the Carolina Sand and Gravel Company at their Kathwood, South Carolina, plant.

Front end view of 8 pump size, hydraulic dredge, with plain suction pipe line, for excavating sand and gravel materials. Carolina Sand and Gravel Company, Kathwood, South Carolina.

Assure . . . Economical and Dependable Production Results

AMSCO Dredge Pumps comprise the latest and most practical features developed in accordance with conditions encountered in actual dredging practice. They are carefully designed to meet all the requirements of sand and gravel pumps.

The continued success of AMSCO Dredge Pumps is due to a policy of building with quality, assuring Durable Construction and Lasting Efficiency.

AMSCO Pumps reflect their ability to stand up when being pressed the hardest for production. They assure maximum protection against operation shutdowns and require minimum cost of repair parts and repair labor. Users of AMSCO pumps will tell you this.

The shell, impeller, side plates and renewable liners are made of the analytically controlled, scientifically heat-treated AMSCO Manganese Steel, the "Toughest Steel Known", which provides the highly essential resistance to impact shock, wear and abrasion. All parts are moulded with heaviest, properly proportioned metal sections and conform to soundest engineering design, embodying distinctive AMSCO features, providing easy flow passages which give maximum hydraulic efficiency and solids capacity.

AMSCO Pumps are built in standard 3-inch, 4-inch, 5-inch, 6-inch, 8-inch, 10-inch, 12-inch, 16-inch and 18-inch sizes for all types of drives.

We invite your inquiry for performance data and details on the type of AMSCO Pump best suited to your operations

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Division of American Brake Shoe & Foundry Company

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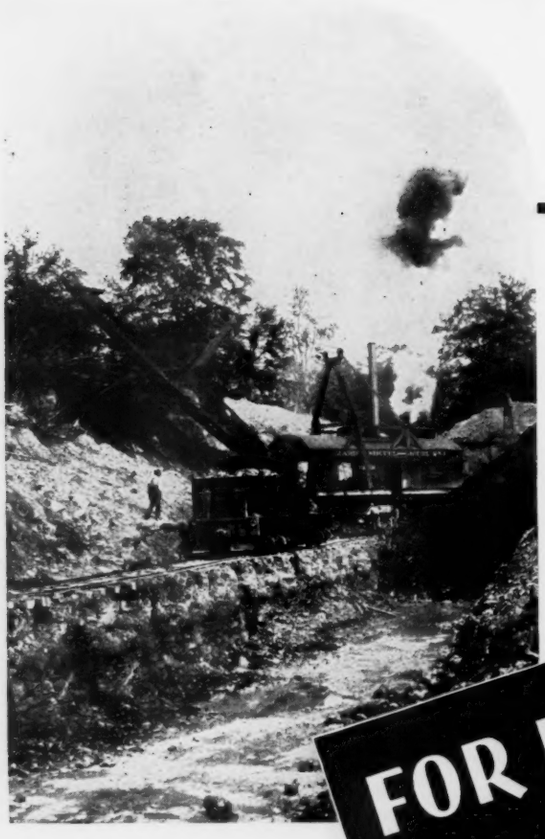

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Outstanding Product

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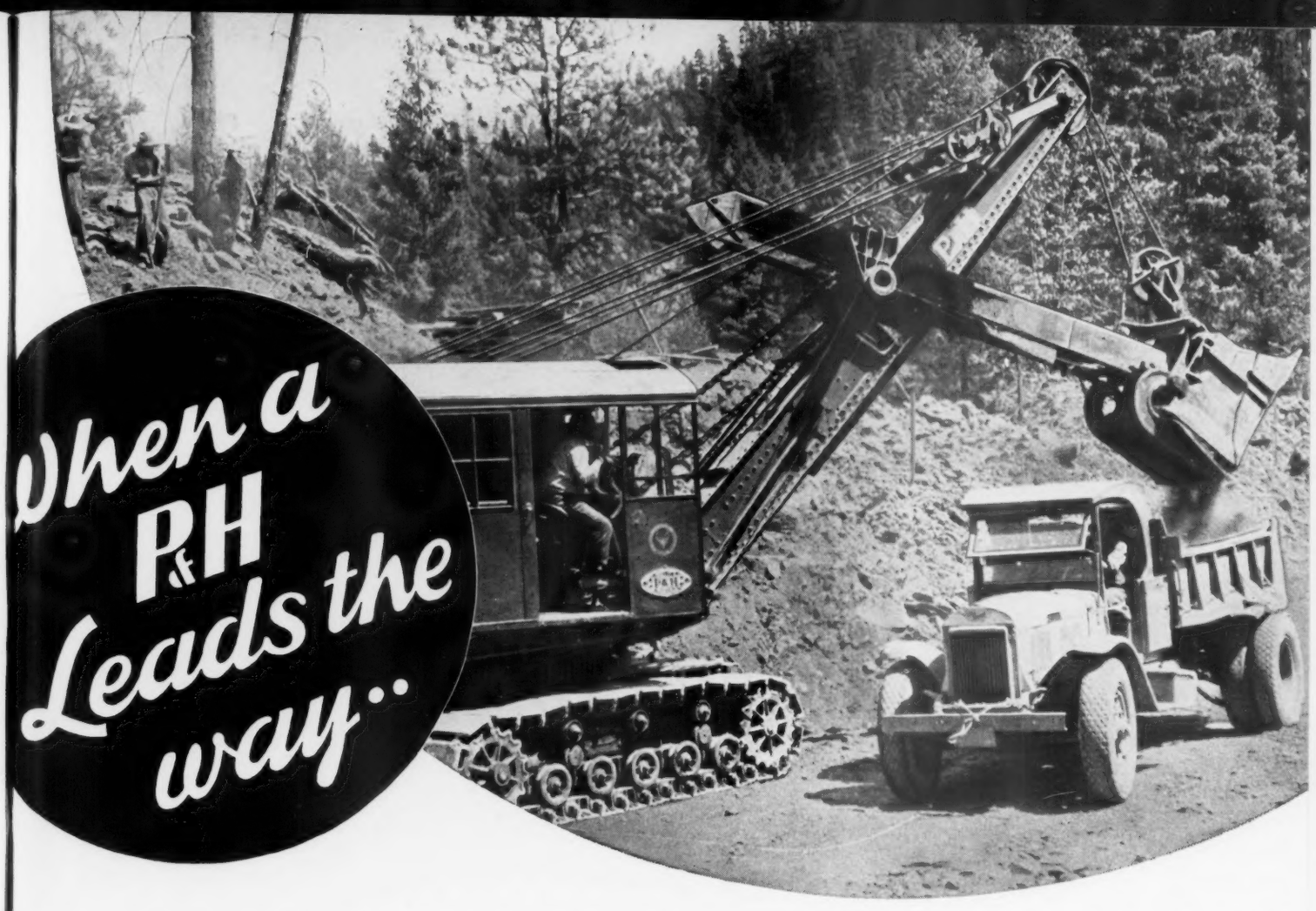

ALL ROAD EQUIPMENT MOVES FASTER!

Your excavator is the spear head of attack on road construction jobs. If it fails, all equipment along the line may have to mark time. That's where P&H speed and stamina show up with continuous high speed production.

But it's not only freedom from breakdown that makes P&H performance so outstanding. It's *Split Second Control* with "Sure Feel" power clutches that protect frame, motor, drums and gears from disabling shocks . . . Super Smooth Swing Clutches that provide faster, more accurate dipper spotting . . . Rapid Reversing Crowd Planetaries that speed up the digging cycle. The P&H chain crowd enables you to grade faster—within 1 inch of floor level. And you can keep it up hour after hour because everything is designed for the easiest possible operation—to save tiring motions and get the most out of the day's work.

This year's road building jobs will be awarded on the basis of the lowest cost per mile. High speed equipment will figure in every bid. Contractors who have the advantage of these modern and advanced P&H features will be in the running on any job. That's why you should investigate them now. . . . There's a P&H working somewhere near you. We'll be glad to tell you where. Watch it hit its stride and see the difference. There's a model for every kind of road job. Write for details on specific sizes.

P&H BANTAM WEIGHT
(Model 100—3/8-yd.)

A new, full-revolving machine that is lighter and faster with all-welded construction. Swift travel, easy steering and quick turning give it tractor mobility. P&H proved features give it dependable high speed production. It's fully convertible at a new minimum of expense. Bulletin No. 100 has complete specifications. Write for your copy.

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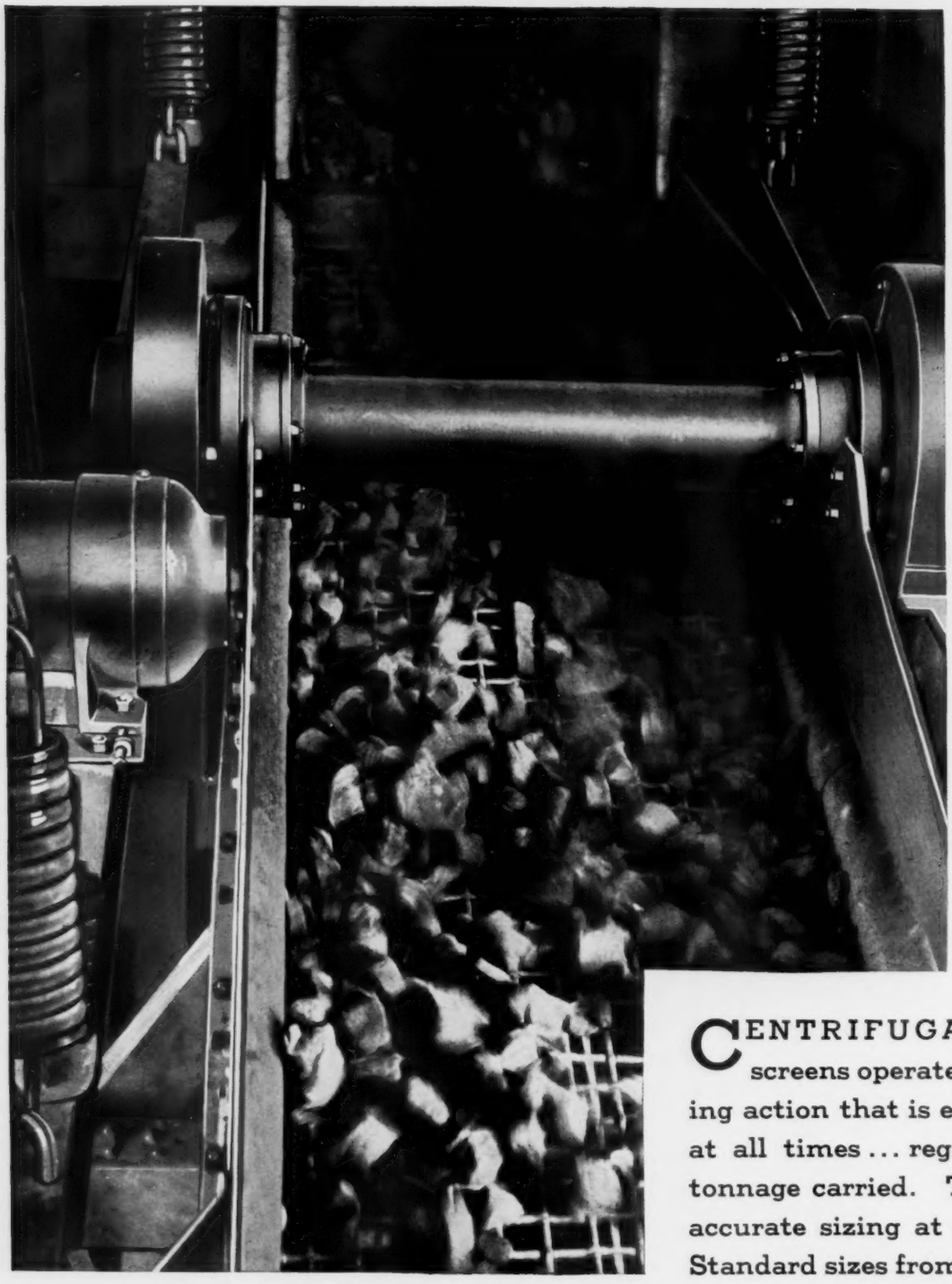
P&H EXCAVATORS FOR ROAD BUILDING

MODEL 100 3/8 YD. · MODEL 400 3/4 YD. · MODEL 600 1 YD. · MODEL 650 1¼ YD.

AND UP TO 4 CU. YARDS

UNIFORM ACTION



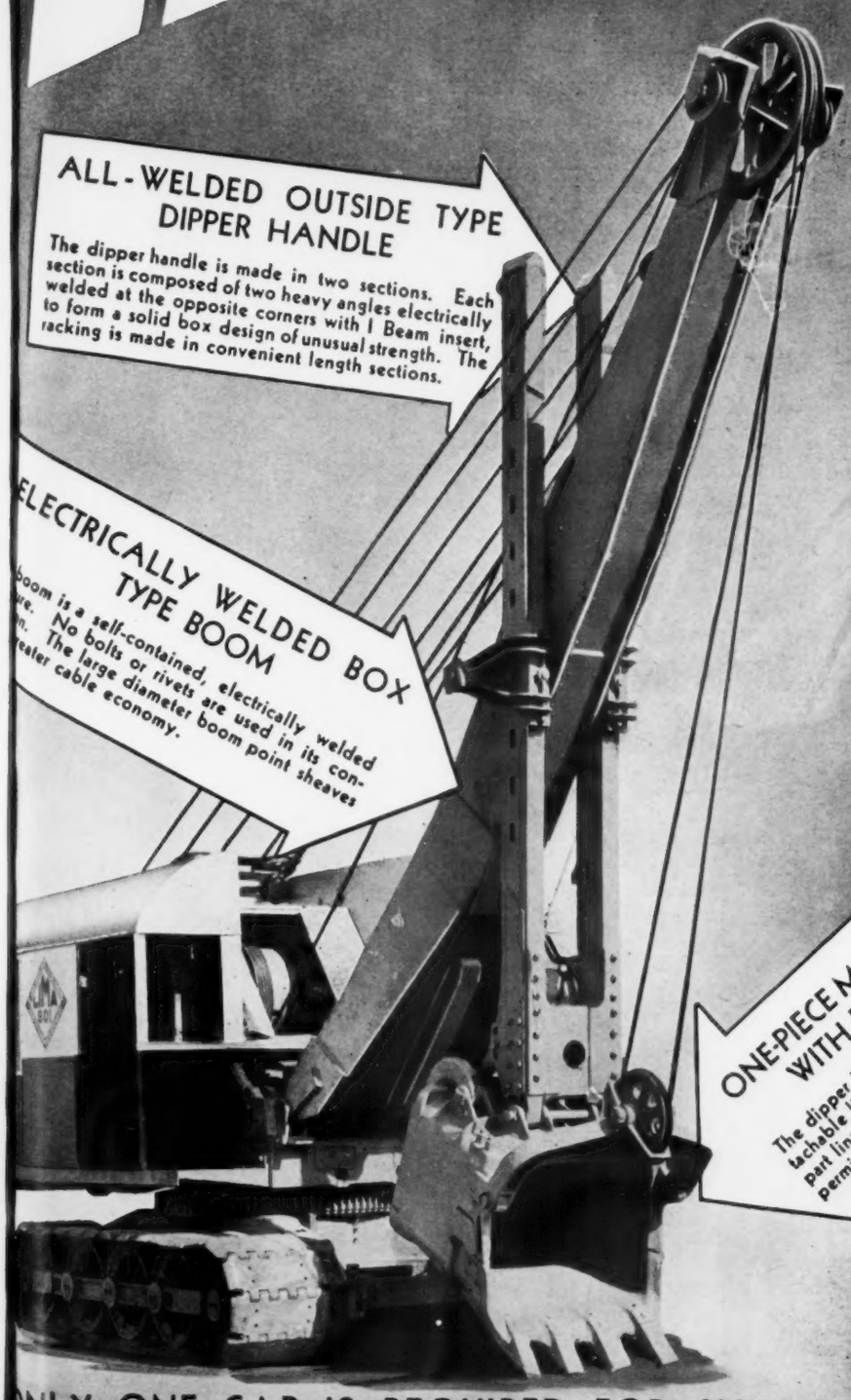
4′x14′ Triple Deck
Centrifugal Vibrating
Screen

CENTRIFUGAL vibrating screens operate with a screening action that is equally intense at all times ... regardless of the tonnage carried. This results in accurate sizing at heavier loads. Standard sizes from 2′x6′ to 5′x14′, single, double and triple deck. Write for Bulletin 1474.

ALLIS-CHALMERS

— Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin, U.S.A. —

LIMA type 801



ALL-WELDED OUTSIDE TYPE DIPPER HANDLE

The dipper handle is made in two sections. Each section is composed of two heavy angles electrically welded at the opposite corners with I Beam insert, to form a solid box design of unusual strength. The racking is made in convenient length sections.

ELECTRICALLY WELDED BOX TYPE BOOM

Boom is a self-contained, electrically welded ure. No bolts or rivets are used in its con- n. The large diameter boom point sheaves ester cable economy.

ONE-PIECE MANGANESE DIPPER WITH DETACHABLE LIP

The dipper is one-piece manganese steel with de- tachable lip. The sheave through which the two- part line passes forms part of the dipper bail, thus permitting maximum digging and dumping heights.

Carefully designed and built from the ground up, a heavy-duty two yard machine, the LIMA Type 801 is meeting the requirements of users whose work demands full two yard capacity from engine to dipper teeth.

The all steel, electrically welded boom with wide flaring base, and the wide-spread dipper handle which holds the dipper squarely against the work is the last word in shovel front ends. Modern heavy-duty construction plus the many advanced and profitable mechanical features offered only by LIMA, is the reason why production records go up and stay up whenever LIMAS are used.

LIMA LOCOMOTIVE WORKS, INCORPORATED

SHOVEL AND CRANE DIVISION

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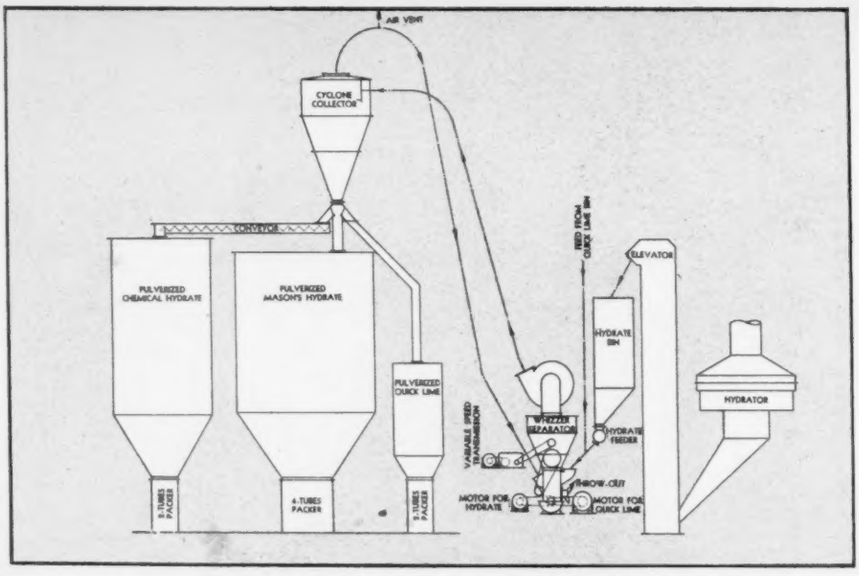
SHOVELS • DRAGLINES • CRANES

LIMAS are built in 3/4 YARD CAPACITY and LARGER



Flow Sheet of Whizzer-equipped Pulverizer for manufacturing hydrated lime and quick lime.

Double Duty Pulverizer for Lime Plants

THE PATENTED WHIZZER—used with marked success on the Raymond Roller Mill and Mechanical Air Separator—now is applied to the Raymond Automatic Pulverizer for giving increased mill capacity, closer control over the product and wider range of classification.

This combination unit is specially adapted for separating hydrated lime and quick lime, one machine serving for both operations. The degree of fineness depends on the speed of the revolving whizzer blades, so that the use of a variable speed transmission on the whizzer drive permits easy regulation of the material from coarse to fine, simply by shifting the speed control lever.

One of the recent installations in a lime products plant consists of a No. 1 Automatic Pulverizer, equipped with throwout device, lump feeder and whizzer with variable speed control, arranged as shown above with feed supply, cyclone collector and finish bins for separate products.

When set for producing hydrated lime at 80% to 99% passing 300-mesh, the mill delivers 4 or 5 tons per hour for the coarse to 3 tons for the fine. When operated at high speed for making burnt lime, at 95% to 98% minus 200-mesh, the mill produces 3½ or 4 tons per hour for the coarse to 2 or 2½ tons for the fine stuff.

This method requires minimum equipment and gives uniform, refined products at new low cost per ton. Write for details.

Request this Catalog on your Company letterhead.

RAYMOND

BROS. IMPACT PULVERIZER CO.

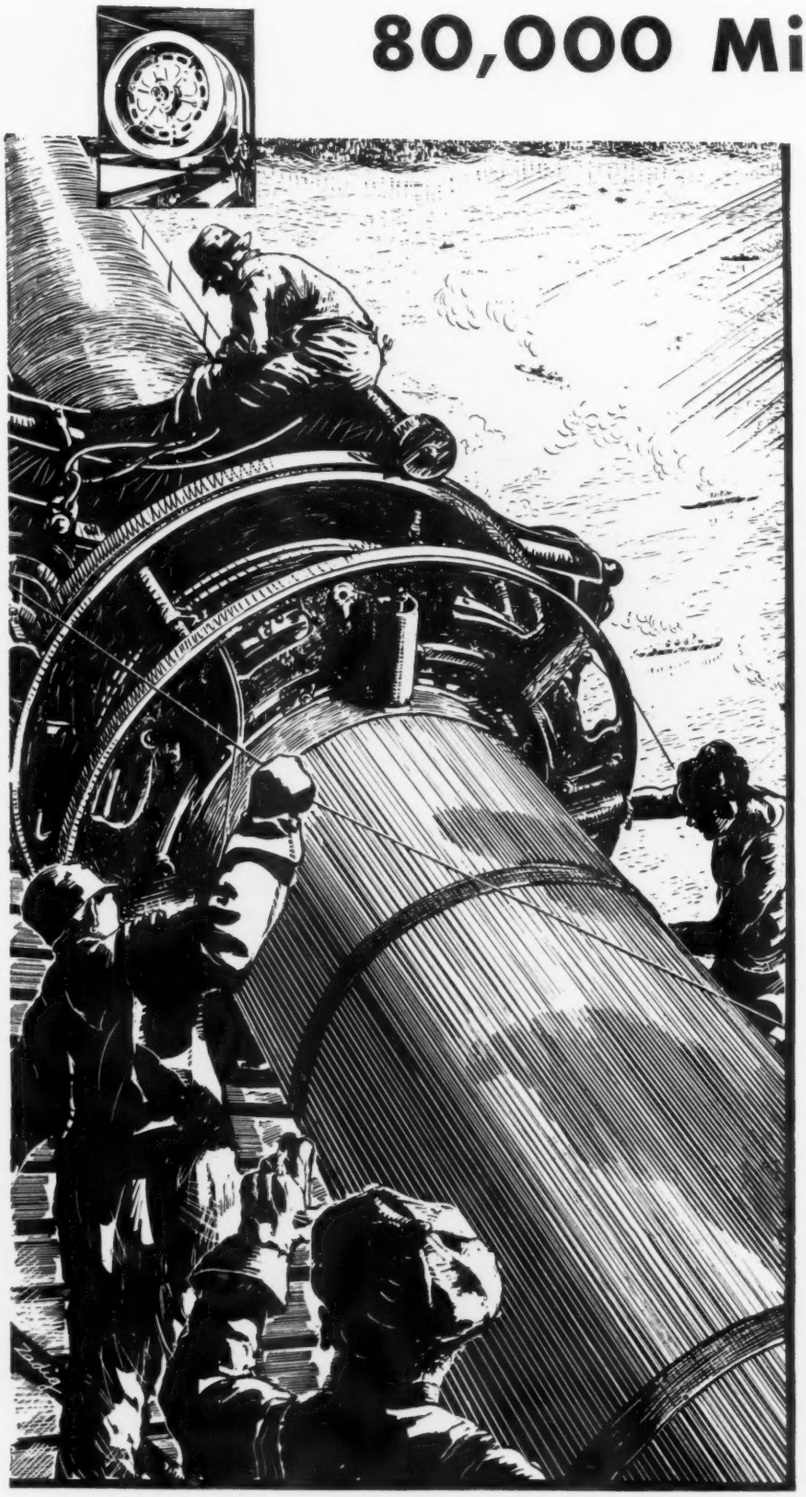
Division of Combustion Engineering Company, Inc.

1321 North Branch Street
Chicago, Illinois

SALES OFFICES: New York and Los Angeles

CANADIAN REPRESENTATIVE:
Combustion Engineering Corporation, Ltd., Montreal

A LIFE-LINE
80,000 Miles Long!



TO MAKE CERTAIN that Roebling Wire Rope will give the user the highest obtainable degree of safe, economical service, Roebling has enlisted the aid of the finest and most complete research, testing and manufacturing facilities. The small, acid open-hearth furnaces shown are examples. John A. Roebling's Sons Co., Trenton, N. J.

When the great bridge to be thrown across San Francisco's famed Golden Gate is completed, the safety of countless thousands will largely depend on two mighty main cables of steel. Weight: 11,000 tons each.

Spun by Roebling, these cables will contain 80,000 miles of Roebling Open-hearth Acid Steel Wire...wire noted the world-over for its strength, toughness, and stamina.

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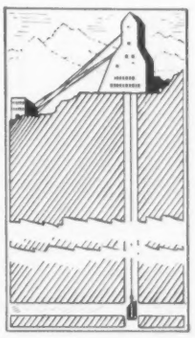

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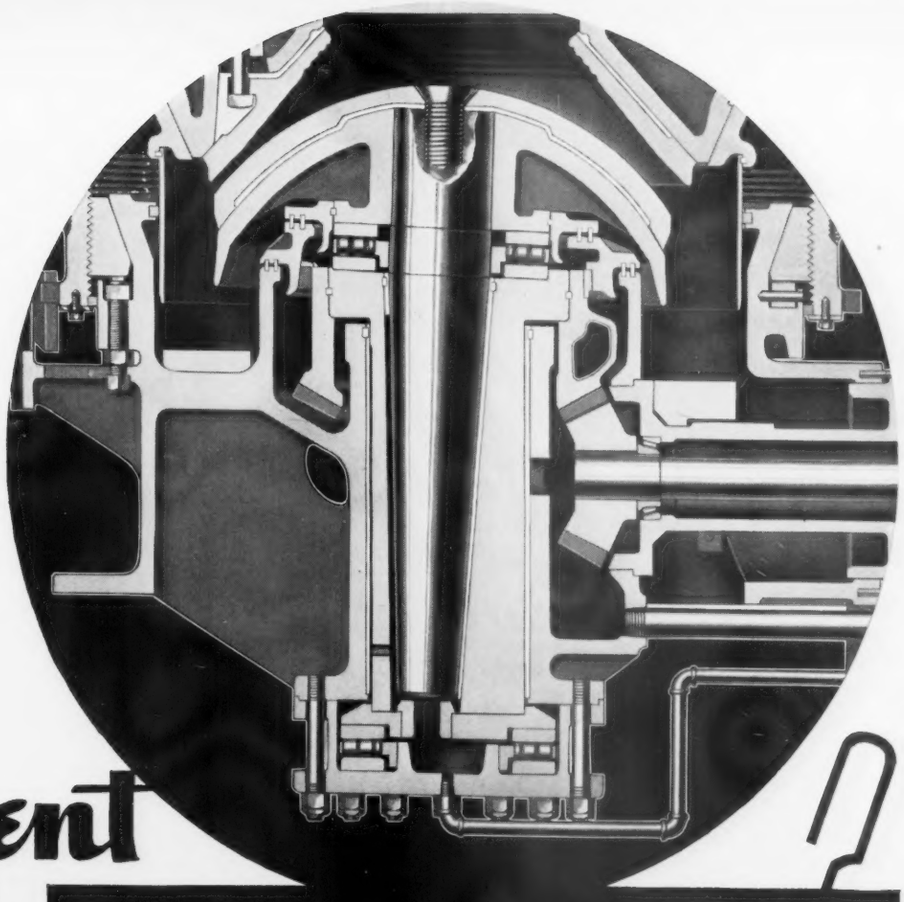

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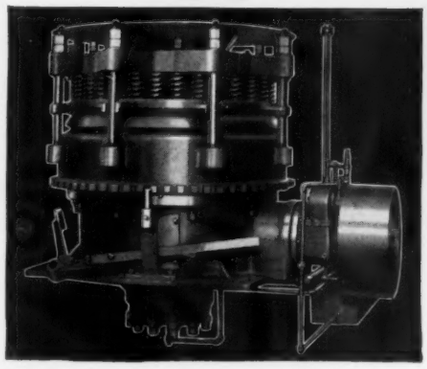

The spherical head and corresponding concave (shown above) are adapted from the first crusher devised by primitive man—the mortar and pestle. The parts are inverted to facilitate discharge; but the crushing action is the same. Particles are caught and broken *between two multi-curved surfaces,* causing an ideal cubing action. The same mechanism that ground corn meal in ancient Egypt now produces an improved cubical aggregate in modern mines and quarries. *Write* for Bulletin Y-15.

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VOLUME 28 NUMBER 2

Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

CHICAGO, AUGUST, 1935

U. S. Cement Imports Show Rapid Increase

BLAME BELGIAN TRADE PACT

Increasing imports of foreign Portland cement are again becoming a menace to the markets and the price structure of the domestic industry along the Atlantic and Gulf coasts. May imports into the United States and its territories of 85,521 bbl. were up 293 per cent. and the total for the first five months of the year was 174,781 bbl., an increase of 144 per cent. over the same period in 1934. This rapid increase is attributed to the reciprocal trade pact made with Belgium several months ago whereby the tariff on cement was reduced by 28 per cent. and to the devaluation of the belga by 28 per cent. The tariff is now 4½ cents per 100 lb. Denmark is also contributing a large share of the imports.

To meet this foreign competition producers supplying the New York area have established a depressed price to dealers in the territories particularly affected by reducing the quotation 36 cents a barrel to $1.82 per bbl. in paper bags. The advancing volume of these imports is in sharp contrast to the steady decline in imports since 1925. The importation of foreign cement has never been much of a factor on the Pacific Coast and producers there do not expect it to become important. It is reported, however, that some Japanese cement is being shipped into Hawaii.

New Equipment Bought by Rock-Asphalt Plant

★ The Calrock Asphalt Co. has completed a series of improvements to its plant and quarry near Davenport, Cal. The shovel in the quarry has been replaced by a Caterpillar Diesel engine and a scraper. At the plant a Clyde Wiley Whirley has been installed along with other equipment.

New York Court Throws Out Standard Trap Award

The Court of Appeals on July 11 in a unanimous decision threw out a claim of more than $2,000,000 previously awarded to the Sparkill Corp. and the Standard Trap Rock Corp., both of New York City, against New York State. The former company was the lessor and the latter the lessee of land taken by the Palisades Interstate Park Commission in 1928. Two trials have already been held but a third has been ordered by the court. The Trap Rock Corp. had nearly completed the construction of a crushed stone plant when the property was taken.

New Ohio Stone Plant Generates Own Power

★ The new plant of the Blosser Stone Co., located near Grover Hill, O., is now in operation. The new machinery installed consists of primary and secondary crushers, a Diesel engine and a 60-kw. electric generator. The company purchased 80 acres of land which has been tested and found to be satisfactory for quarrying. A charge of 3,500 pounds of dynamite was used to loosen 7,000 tons of stone in preparation for the operation of the plant.

Universal Atlas Plant Has 4-Yr. Safety Record

Employees of the plant of the Universal Atlas Cement Co., at Universal, Pa., on July 13 celebrated the completion of four years of continuous operation without a lost-time accident. B. F. Affleck, president of the company, was present to congratulate the workers on their record. Other speakers included State Senator Wm. B. Rodgers, president of the Western Pennsylvania Safety Council, and A. J. R. Curtis, assistant general manager of the Portland Cement Ass'n. R. L. Slocum, plant superintendent, was in charge of the celebration.

Gravel Plant in Texas Installs New Crusher

★ A new Pioneer Gravel Equipment Co. crusher has been installed in the Texas Sand & Gravel Co. plant at Amarillo, Texas.

★ The Southwest Lime Co., Inc., Neosho, Mo., recently purchased a new Sullivan air compressor and four new Chevrolet trucks.

Michigan Road Letting Total Near 3 Million

WORK TO BEGIN IMMEDIATELY

Bids on $2,886,700 worth of road projects were submitted July 25 to the Michigan State Highway Dept. at Lansing, Mich., said to be the largest amount ever placed at one time in that state. About $450,000 of this work comes under the Federal aid program for last year and the balance are new projects. On July 26 the successful bidders on $1,708,906 worth of this work were announced. Michigan is said to have been the first state to obtain approval from federal authorities on its road program. According to M. D. Van Wagoner, state highway commissioner, work will commence August 5 on the first projects.

Install Dry Ice Unit at Oklahoma Cement Plant

★ What is said to be the largest dry-ice manufacturing plant in the Southwest is nearing completion at the plant of the Oklahoma Portland Cement Co. at Ada, Okla. This unit will utilize carbon-dioxide from the kiln stack gases. Dust will be washed from these gases and other chemicals absorbed from them leaving pure carbon dioxide from which the dry ice is made. The plant is expected to be in operation in August.

Washington Cement Plant Idle Since January Opens

The plant of the Lehigh Portland Cement Co., Metalline Falls, Wash., resumed operations on July 5. The plant had been idle since January. The extensive improvements under way at this plant which were reported in the June issue of PIT AND QUARRY have been completed.

Wisconsin Gets 500-Yd. Gravel-Washing Plant

★ A sand and gravel washing plant has been erected at Ahnappee, Wis., by the Krueger Construction Co., of Algoma, Wis. The new plant will have a capacity of 500 cu.yd. of washed material a day when in full operation.

Issue New Rules for Works Road Program

INCREASES MATERIALS MARKET

The Federal government's highway-construction and grade-crossing elimination program has been given new life by President Roosevelt's approval of revised and alternate rules and regulations covering the expenditure of the $400,000,000 allotted for such projects. The change in the rules is believed to have improved the prospects of accomplishing the following results:

1. Provide employment, directly and indirectly, for 750,000 workers for at least a year.

2. Provide greater impetus to the durable-goods industries than has been given by any emergency relief undertaking.

3. Make possible a normal highway building program that will fit into whatever permanent plan is adopted by Congress for improving and maintaining American highways as the emergency passes and present restrictions are relaxed or removed.

4. Assure continuation of the contract system.

5. Enable states that are in a financial position to do so to undertake a long-range highway program covering their full needs and obtain present Federal emergency funds for immediate initiation of these permanent, adequate programs.

The results accomplished will necessarily depend upon the policy followed by the Works Progress Administration, The National Emergency Council and the Bureau of Public Roads as the individual states submit their programs for approval under the new rules, which may be summarized somewhat as follows:

Of the $200,000,000 now available for highways, 25 per cent. is to be spent for secondary or feeder roads not on state or federal systems, 25 per cent. for pavements within municipalities, and the remainder for Federal and state highways.

The states may choose any of the following plans for utilizing the Work Program highway funds:

A. Every project must be measured on the basis of providing the equivalent of a man-year of employment at a cost to the Federal government of $1,400, the state to supply any additional funds that may be necessary to complete the project. The Federal government's obligation is limited to $1,400 per man-year or its equivalent of 90c per man hr. of employment.

B. The state may enter into an agreement to give employment from the relief rolls up to its full quota of individuals determined by dividing the state highway allotment by the allowable expenditure of $1,400, or to provide the equivalent in man-hours of employment on the basis of 1,560 man-hr. of employment per year.

C. The state may agree to give employment at determined wage rates and hours for a period of one year, or the equivalent man-hours of employment on highway work under direct supervision of state highway departments.

Other details of the rules and regulations cover hours of work; pay-roll reports; labor provisions, among which is one requiring that workers must be taken from employment agencies designated by the United States Employment Service; and restrictions governing contractors on materials purchased, etc.

Of the $200,000,000 now available for grade-crossing elimination and protection, not less than 25 per cent. of each state's apportionment shall be expended on crossings on secondary or feeder roads. Four types of projects are outlined: (1) Protection of grade crossings; (2) separation of grades at crossings; (3) reconstruction of existing structures; (4) relocation of highways to eliminate grade crossings.

The protection of crossings include methods and devices acceptable to the state highway departments and railroads affected.

State highway departments and railroads must agree before crossings are eliminated or protected.

The method of distribution may be varied in accordance with the importance and danger of conditions surrounding grade crossings.

Alternate rules provide: (1) The total cost to the Federal government, including labor and materials, shall not exceed $1,400 per man-yr. for direct employment. (2) Forty per cent. of the total cost, including the cost of private property, must go to persons directly employed on the project.

At least 90 per cent. of all the workers must be taken from relief rolls.

Under an optional plan authorized, states desiring to do so may propose any alternate plan to meet the employment objectives of the government. The principal requirement is that the state take from relief rolls its full quota of workers determined by dividing the grade-crossing allotment by the expenditure of $1,400 per man-yr.

East Peoria Gravel Men Build Chillicothe Plant

★ John Gibbons, president of the East Peoria Sand & Gravel Co., East Peoria, Ill., and the other members of the firm have organized a new company to be known as the Chillicothe Gravel Co., to be located at Chillicothe, Ill., where it is now building a gravel plant on a 22½-acre tract of land. The offices of the new company are located at East Lane, East Peoria, Illinois.

Rumor Possibility of Additional Road Funds

It has been rumored that a large sum (close to half a billion dollars) may be set aside by the relief administration for constructing "farm to market" roads. This work would be done directly by the government and would have nothing to do with the original allotment of $400,000.000 for road building under private contracts nor with an additional $400,000,000 which may be allocated for a similar purpose later.

Kentucky Stone Firm Makes Improvements

★ The Tygart Limestone Co., Lawton, Ky., has improved its plant by the installation of an Allis-Chalmers crusher and vibrating screen, a Tyler vibrating screen, a Barber-Greene conveyor and a 300-hp. Diesel engine.

★ A new Eagle screw washer has been installed at the plant of Seybold Bros., Dunkirk, N. Y.

June Contract Volume Highest Since March '34

GAINS 18 PER CENT. OVER MAY

The construction industry in June turned in a higher contract volume than was shown for any other month since March, 1934, when activity under the PWA program was tapering from its peak. According to figures from F. W. Dodge Corp., June contracts for total construction in the 37 eastern states amounted to $148,005,200. This represented a gain of almost 18 per cent. over the total for May and almost 17 per cent. over the volume for June last year.

Of the June, 1935, total, residential building amounted to $49,832,600; this was more than 10 per cent. greater than the total for May and almost twice the volume reported in June, 1934. In fact, the June residential building total was greater than was shown for any single month since October, 1931. Non-residential building awards in June amounted to $59,035,800, while contracts for heavy engineering projects—chiefly highways, bridges, and the like—totaled $39,136,800 in June.

Residential building improvement as compared with June, 1934, totals was reported in each of the 13 Dodge districts east of the Rockies. The largest increases occurred in the Middle Atlantic States, the Chicago Territory, the Central Northwest, the St. Louis Territory and the Kansas City District.

Residential building awards let during the first six months of 1935 in the 37 eastern states as a whole amounted to $208,173,300 as against only $131,762,900 for the corresponding six months of 1934. Besides recording an advance of almost 58 per cent. over the half-year total for last year the volume of residential awards during the initial half of 1935 was greater than has been shown for any similar period since the total for the first half of 1931.

Agricultural Limestone Plant Begins Operations

★ The Monmouth Stone Co. on July 8 put into operation a new plant 3 miles west of Monmouth, Ill., for the production of agricultural limestone. Eight men are now employed and it is expected that more will be added later.

Inland Lime and Stone Builds Storage Tunnels

★ Additional storage facilities are now under construction at the docks of the Inland Lime & Stone Co. located at Port Inland, Mich. The new storage tunnels will be used for handling dolomite rock and are expected to be completed by Oct. 1.

Producers Would Share in Alabama Projects

NOVEL WORK PLAN IS PROPOSED

Alabama manufacturers of materials of all kinds used in paving and bridge building recently sent a delegation to the capital at Montgomery to approve a plan suggested by Governor Graves which would make it possible for them to share in the supplying of materials for the $8,200,000 allocated to Alabama from the Federal work relief fund. On the $1,400 per year per man basis, it is claimed, it would not be possible to purchase materials of any kind. The plan, which Gov. Graves is expected to present to officials in Washington for their approval, is that industry will give employment to a large number of men now on relief rolls if, in return, the Government will, with the funds it would otherwise expend putting these men to work and keeping them at it, purchase the durable materials for road paving and bridge building resulting from increased production of industries turning out these materials, as a consequence of giving employment to these additional men.

In a number of other states where the limitation on expenditure of Federal funds for roads made the laying of paving impossible State money has been set aside for this purpose. Alabama has no surplus money for such an outlay, however, so that if any paving is to be had other means must be employed to obtain it.

State Will Sell Michigan Cement Plant Equipment

The cement plant owned by the state of Michigan located near Chelsea, Mich., is now being demolished by prison labor. The sale of the machinery and other salvaged material from the plant will be handled by the state administrative board. The land will be offered for sale when all equipment is sold.

New York Cement Plant Suffers Flood Damage

The plant of the Pennsylvania-Dixie Cement Corp. at Portland Point, N. Y., suffered severe damage in the extensive floods which swept that part of the state early in July. The plant was forced to suspend operations entirely and the entire force of 140 men are at work cleaning up the wreckage and debris. The plant may be reopened about August 1. Several plant buildings were shoved from their foundations and machinery including motors and turbines were buried beneath gravel and debris. A string of concrete garages in which were 16 employee's automobiles were completely buried and another building housing a company truck was completely washed away. The plant was operating on night shift when the flood struck and forced the 20 men on duty to run to safety without their cars.

Dolese Improving Stone Plant Near Hartshorne

★ The Dolese Bros. of Chicago, Ill., have nearly completed the reconstruction of the crushed stone plant near Hartshorne, Okla., which they purchased from the late C. E. Van Orman shortly before his death. New bins with a capacity of about 1,000 tons, a repair shop and a storage building have been erected and many other improvements made. It has been announced that operations will be resumed in August.

Wet Screening Replaces Dry in Little Rock Plant

★ The Big Rock Stone & Material Co., Little Rock, Ark., has changed its mixing plant from volume to weight measure using Johnson scales. Equipment has also been purchased for changing the stone plant from dry to wet screening.

Idaho Cement Increases Storage by 50,000 Bbl.

★ According to Eugene Enloe, president of the Idaho Portland Cement Co., improvements totaling $40,000 are being made at its plant near Pocatello, Idaho. Additional storage is being built for 50,000 bbl.

★ The Magic City Supply Co., Muncie, Ind., has completed the installation of a Traylor roll crusher in its plant.

Marquette Plant Wins No-Accident Trophy

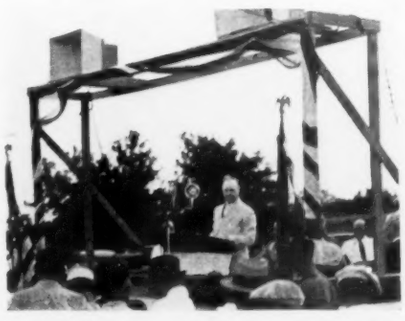
FOLLOWS EIGHT YEARS' STRIVING

For eight years the Oglesby, Ill., plant of the Marquette Cement Mfg. Co. entered the annual contest for the no-lost-time-accident trophy of the Portland Cement Assn. but not until 1934 did it win the long-sought prize. The trophy-dedication ceremony of July 15 was an occasion for general satisfaction among officials and employees of the company, who gathered at 10 o'clock in the morning of that day to participate in an interesting program which culminated in a picnic at Duncan's Woods, owned by Stuart Duncan, chairman of the company's board of directors.

Following the raising of the flag by the Oglesby Post of the American Legion, Richard Moyle, the company's vice-president, welcomed the audience in the genial and winning manner which his friends know so well. The trophy was presented to the company and its employees by A. J. R. Curtis, assistant to the general manager of the Portland Cement Assn., and manager of its Accident Prevention Bureau. After the unveiling of the trophy it was accepted by E. W. Fitzgerald, representing the employees of the plant. In his presentation speech Mr. Curtis paid fitting tribute to the persistency of the employees and the encouragement of the management which had resulted in the winning of the trophy.

Stuart Duncan commented briefly on the accomplishment and was followed by the company's president, W. A. Wecker, who congratulated the workers, department heads and those active in safety-promotion work at the plant for their having achieved a result which required such a high degree of intelligent coöperative effort—a full year's operation without a single lost-time accident. At the close of the program the guests departed for Duncan's Woods, where the company was host to more than 2,000 picnickers from Oglesby and LaSalle, Ill.

★ The Southwestern Portland Cement Co., has purchased a Wagner Turbidimeter for its plant at Victorville, Cal.



Left: President Wecker addressing Marquette crowd. *Above:* The trophy. *Right:* Vice-president Moyle.

Accident Rates Down in Quarry Industries

CEMENT INDUSTRY HAS INCREASE

The quarry industry made marked reductions in accident rates during 1934, whereas the cement and mining industries experienced increases, preliminary figures just issued by the National Safety Council show.

The 1934 frequency rate for the quarry industry is 10 per cent. below that of 1933 and the severity rate is 45 per cent. lower. In the cement industry the frequency rate is 33 per cent. higher and the severity rate is 57 per cent. greater. The 1934 frequency rate for the mining industry is 2 per cent. higher than that of the previous year, while the severity rate it 23 per cent. higher. These rate changes may be compared with increases of 5 per cent. in each rate averaged by industry as a whole.

The 1934 rates are calculated in accordance with the National Safety Council's standards. The injury frequency rate is determined by the number of disabling injuries per 1,000,000 man-hr. of work, while the injury severity rate is determined by the number of days lost through disabling injuries per 1,000 man-hr. of exposure. The latter rate includes arbitrary charges for permanent disabilities and deaths. The rates for the various industries are calculated on 1934 reports of organizations reporting to the council.

The 1934 reports for 135 quarries, whose employees worked 11,187,000 man-hr., averaged 17.34 for frequency, as compared with 15.29 for industry as a whole, and 3.53 in severity, as against 1.70. Reports from 114 cement plants, whose employees worked 29,866,000 man-hr., averaged 6.50 for frequency and 3.89 for severity. Reports from 168 mining companies averaged 51.45 for frequency and 10.19 for severity.

The frequency of disabling injuries has decreased 56 per cent. in the quarrying industry since 1926, in comparison with 57 per cent. for industry as a whole. In severity, quarrying has had a decrease of 82 per cent., as against a reduction of only 37 per cent. for industry as a whole. The frequency of disabling injuries has decreased 65 per cent. since 1926 in the cement industry, and the severity 28 per cent. in the mining industry the decrease since that time has been only 15 per cent., while there has been an actual increase of 86 per cent. in the severity rate.

Among plants of various sizes in the cement industry the accident rates were: Large units—frequency, 6.65, and severity, 3.17; middle-sized units—frequency, 5.02, and severity, 3.79; small units—frequency, 8.92, and severity, 6.94. Large units made the best records in dealing with severe injuries. They registered a 6 per cent. decrease in the severity rate under that of 1933, while middle-sized units had an increase of 204 per cent., and small units an increase of 406 per cent. In frequency, however, small units had the best record, experiencing only a 14-per cent. increase, as compared with a 57-per cent. increase in middle-sized units, and a 33-per cent. increase among large units.

In the mining industry, non-metal mines had the lowest 1934 frequency rate in the industry, averaging 22.27, while metal mines had the lowest severity, 5.72.

Machinery Makers Act to Form Trade Group

Action directed toward the formation of a Construction Machinery Assn. was taken by equipment manufacturers who gathered in an open meeting at the Edgewater Beach Hotel, Chicago, on July 17, as guests of the Associated Equipment Distributors, who held their convention there. Effective coöperation with members of the A.E.D. in the improvement of trade practices and the elimination of abuses is one of the ends sought.

A committee, headed by S. F. Beatty, president of the Austin-Western Road Machinery Co., Aurora, Ill., and composed of representatives of other equipment makers, met and delegated to A. C. Blaisdell, of the Blaisdell-Foltz Equipment Co., Cincinnati, O., and William Ogden, executive secretary of the Road Machinery Manufacturers' Assn., the task of preparing a prospectus, which was to be considered and devised by the committee and then mailed to all machinery makers within 10 days. The other members of the committee, besides Mr. Beatty, are George M. Etnyre, E. D. Etnyre & Co., Oregon, Ill., representing the pressure-distributor-makers; Morgan Butler, Butler Bin Co., Waukesha, Wis., representing the bin and batcher makers; P. A. Birckhead, Bucyrus-Erie Co., South Milwaukee, Wis., representing the shovel, crane and drag-line makers; L. W. Yerk, Pioneer Gravel Equipment Mfg. Co., Minneapolis, Minn., representing the rock-crusher makers; C. L. Dunham, Sullivan Machinery Co., Chicago, representing the air-compressor makers; J. R. McGiffert, Clyde Sales Co., Duluth, Minn., representing the hoisting-engine makers; William Parrish, International Harvester Co., Chicago, representing the tractor makers; W. B. Greene, Barber-Greene Co., Aurora, Ill., and C. W. Zackow, Atlas Conveyor Co., Clintonville, Wis., both representing the conveyor makers; and George Dimond, Koehring Co., Milwaukee, Wis., representing the concrete-mixer makers. Chairman Beatty represents the road-machinery manufacturers.

★ The Pennsylvania Dixie Cement Corp. recently added a Wagner Turbidimeter to the laboratory equipment of its plant at Bath, Pa.

8,530 Miles PWA Road Projects Being Built

136,039 MEN DIRECTLY EMPLOYED

Progress made on emergency construction of public-works highways to June 30 under the supervision of the U. S. Bureau of Public Roads shows a total of 347 projects, estimated to cost $13,876,000, approved but contracts not yet awarded; 486 projects, estimated to cost $13,951,000, awarded but not yet under construction; 3,338 projects, estimated to cost $185,044,000, under construction; and 9,081 projects completed at a cost of approximately $397,362,000.

The 3,338 projects under construction involve 8,530 mi. of road and are giving regular direct employment to 136,029 men.

Ohio Gravel Plant Adds A New Vibrating Screen

★ A Deister Machine Co. vibrating screen has been installed at the plant of Henry W. Koch & Sons, R. F. D. 5, Wapakoneta, O. Plans are in progress for additional changes at the plant.

New Organization Leases Sturgeon Bay Quarries

The Sturgeon Bay Materials Co. of which John Roen is pres.; John Purvis, sec., and R. C. Deroucher, v.-pres., gen. mgr., has leased two quarries of the Sturgeon Bay Co. for a period of two years. The quarries are located at Sturgeon Bay, Wis., and Detour, Drummond Island, Mich. E. E. Holsinger is general manager of the Sturgeon Bay quarry and R. C. Deroucher is general manager of the Drummond Island quarry. Rip rap will be produced at both locations and crushed stone at Sturgeon Bay.

Pacific Portland Gets Large Cement Contract

The United States war department awarded a contract to the Pacific Portland Cement Co. of San Francisco, for furnishing 565,000 barrels of Portland cement for use in construction of the Bonneville dam. The total bid of the cement company was $916,522.

Material Level Devices Put on Hercules Bins

★ The Hercules Cement Corp., Nazareth, Pa., has installed six Ripley Bin-Dicators in various parts of its plant. These devices control the level of material in packer bins.

★ The Cook Sand and Gravel Co., of Meadow Grove, Neb., is repairing and installing new equipment in the pumping system at its plant.

Silicosis Lawyers Are Accused of Barratry

CLIENTS TESTIFIED FALSELY

A disbarment suit against Everett J. Hullverson, St. Louis lawyer who has specialized in silicosis damage suits, and three of his associates was filed July 24, in the Supreme Court of Missouri by the Bar Committee for the Eighth (St. Louis) Judicial Circuit. The co-defendants are Attorneys Eugene J. Schmick, Robert L. Pribble and Francis O. Curran. The petition alleges that the four attorneys have since 1929 conspired to engage in the unprofessional and unethical practice of law. Separate counts of the petition allege:

That they became common barators, by soliciting business, agreeing to pay the costs of litigation and medical examinations and to advance funds to those who employed them.

Hired agents and runners to solicit business for them.

Accepted employment to prosecute claims and suits which they knew or had reason to believe were based on fictitious and fraudulent allegations.

Split fees with persons who were not lawyers.

Directed clients to cough, limp and make other feigned manifestations of illness.

Acted as attorneys for persons who had not employed them, but who had signed contracts of employment without knowing what they were signing.

Represented falsely that Robert Poe and Dan Corcoran, associated with them, were licensed to practice law.

Induced a client in a silicosis case to give false testimony in the trial of the case.

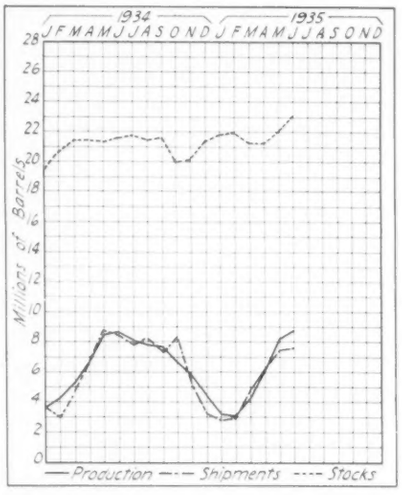
The Supreme Court has given the attorneys until Aug. 10 to file briefs.

The charge that the four lawyers advised a client to give false testimony refers to the suit of Ralph Davis against the Tavern Rock Sand Co. Davis, the petition declares, was advised to testify falsely that the defendant company did not furnish respirators to its employees as a protection against silica dust, and that he "coughed a lot and felt pains in his side."

The truth was, the petition declares, that Davis had informed the lawyers, or some of them, that the company did furnish respirators and that he did not cough or feel pains in his side. The petition adds that the attorneys, or some one of them, "instructed and directed the said Davis that when he took the witness stand at the trial of the cause, or when in the courtroom in the presence of the jury, he should cough and pretend to spit up something in his handkerchief for the purpose of deceiving the jury."

June Cement Production Highest Since June 1934

The Portland-cement industry in June, 1935, produced 8,730,000 barrels, shipped 7,624,000 barrels from the mills, and had in stock at the end of the month 23,098,000 barrels. Production of Portland cement in June, 1935, showed a decrease of 0.9 per cent. and shipments a decrease of 10.7 per cent., as compared with June, 1934. Portland-cement stocks at mills were 6.9 per cent. higher than a year ago.



Cement production, shipments and stocks to June 1936.

The total production for the first half of 1935 amounts to 33,642,000 barrels, compared with 37,115,000 barrels in the same period of 1934, and the total shipments for the first half of 1935 amounts to 31,926,000 barrels, compared with 35,165,000 barrels in the same period of 1934. The statistics here given are compiled from reports for June, received by the Bureau of Mines, from all manufacturing plants except two.

1500-Ton Gravel Plant Building in Michigan

★ Manning & Locklin Northville Co. of Detroit, Mich., have dismantled their plant at Northville, Mich., and are now building a new plant on a 90-acre tract of land near Northville. The new plant when in operation will have a daily capacity of 1500 tons of sand and gravel.

Complete Reorganization of Bessemer L. & C. Co.

The reorganization of the Bessemer Limestone & Cement Co., of Youngstown, O., has been completed and, effective July 1, an Ohio corporation took over the business of the former Delaware corporation of the same name. Charles Schmutz retains his position of president of the company and R. C. Steece is chairman of the board. According to Mr. Schmutz business so far this year is better than for the corresponding period of 1934 and prospects are much brighter.

★ The Soo Sand & Gravel Co., Sault Ste. Marie, Mich., recently completed the enlargement of its plant. Among the equipment added was a Deister triple-deck vibrating screen and two Jaeger truck mixers.

Largest Gravel Plant for Grand Coulee Dam

TO PRODUCE 14,000 CU. YD. DAILY

Plans for the construction of washing and screening plants to produce sand and gravel for Grand Coulee Dam in Washington have been released. A large shovel will load from the pit to two field conveyors mounted on crawlers through hoppers at their ends. These conveyors will discharge to a 5-ft. wide main belt conveyor with a capacity of 2,500 tons per hour, which in turn will discharge the aggregate through a chute to a stockpile 300 ft. below. Another 5-ft. belt conveyor will carry the material to the primary screening and crushing plant. The crushed material will be dropped to a 48-in. belt conveyor which will discharge it to a surge stockpile. Another 48-in. belt conveyor will reclaim this material from storage and feed it to the final screening and washing plants. A belt conveyor will feed the finished aggregates to stockpiles from which they will be reclaimed by a tunnel belt conveyor. The plant will have a capacity of about 14,000 cu. yd. daily and will supply a total of about 4,400,000 cu. yd. of aggregates for the dam. More than three miles of conveyors alone will be required. Construction of this plant is now well under way.

Georgia Kaolin Company Installs Fourth Drier

★ The Georgia Kaolin Co., Dry Branch, Ga., has installed a Christie drier made by the Duff Patents Co., Inc., Pittsburgh, Pa. A total of four driers of this make are now used in this plant.

National Gypsum Plans Big Expansion Program

The National Gypsum Co., Chicago, Ill., according to its president, Melvin H. Baker, is about to undertake a comprehensive building program, not only to increase the capacity of present plants, but to provide new plants at points where competing companies have hitherto been dominant. According to Mr. Baker the company's business has been steadily increasing for the past three years and prospects for the future are very good. The above announcements were made at a special meeting of stockholders of the company on June 25 at which a plan for paying the dividend arrears on the company's 7 per cent. preferred stock was approved. An increase of 100,000 shares in authorized Class A common stock and a new issue of 26,000 shares of new $20 par 5 per cent. preferred stock were also approved.

★ A new steam shovel has been added to the equipment at the plant of the Mt. Vernon Sand and gravel Co. located at Mt. Vernon, O.

Editorials

Bigness Versus Smallness

ALTHOUGH the casual observer of events may not be aware of it, a conflict of theories between the advocates of "bigness" and those who plead for "smallness" is going on before our eyes. The theories touch not only the realm of business, wherein the debate has been popular for years, but that of politics as well, as we all have had an opportunity to see in the tendency toward greater concentration of power in centralized government.

The proponents of the theory of smallness in the economic field look back with longing eyes toward the individual home industry of the days before the factory system. They praise the independence of the husbandman and the quality of his work. They see nothing but good in what they call his liberties and the freedom of the competition that existed between him and his rivals. They would like to have us reëstablish that "golden age" when industrial strife and the oppression of monopoly were unknown.

Their opponents point to the advances we have made in technology and industrial organization as evidence of the benefits of the trend toward bigness in business. Under no other system than that made possible by bigness could these changes have been brought about, and under no other system could their gains been made available to the masses, they contend. In their view this era, characterized by the prevalence of industrial bigness and a growing belief in its virtues, is the true "golden age" of economic history. In view of the profits that were made in this "new era," we may accept the term as aptly descriptive of at least one characteristic of the period.

Those opposed to the theory of bigness cite geological evidence and the interpretation of palæontologists, which tell us of the struggle between these qualities of bigness and smallness, as proof that bigness is doomed. They make much of the theory that in the course of evolutionary development bigness made way for smallness, awkwardness for nimbleness, slowness for speed. And as the few examples of animal bigness that remain lead a perilous existence and as their numbers grow smaller rather than larger, the tests of survival in the matter of size appear to be still at work and thus lend a degree of plausibility to the contention.

But the advantages of bigness in the field of business, as exemplified by the trend toward monopoly even where this does not seem to be of the variety called "natural," have been sufficiently evident to win general recognition. The question whether these advantages are private or public—whether they are confined solely to the owners of big business or whether they are shared by their customers as well—may remain unanswered, but the existence of those benefits can hardly be doubted.

In their ability to survive the trials of economic depressions small businesses have shown numerous advantages over their larger rivals. Their ready adaptability to new conditions, their ability to reduce expenses more rapidly than they curtail their activities, their freedom from the fixed expense of large organizations which can not be easily or quickly reduced, have greatly simplified their problems of readjustment. Large businesses depend for the realization of their advantages—such as huge purchasing power and low unit producing and selling costs—on the existence of a large demand for their products or services, and when this demand shrinks through the impairment or destruction of consumer purchasing power, those advantages disappear and often become transformed into disadvantages.

The challenge to bigness touches plant and machine capacity as well as financial organization and management. In the electric-power industry, for example, some engineers doubt the wisdom of increasing the capacity of generators beyond the maximum size now available, believing that the law of diminishing returns has begun to affect earnings and that the optimum size for single units has already been attained and possibly exceeded. In the aggregates-producing branches of our own industries there is a growing belief that in many localities the large plant, dependent for profitable operation on a large and fairly well sustained demand for its products, will be forced to make way for smaller units, which can show an operating profit on a small output and which, when idle, do not add quickly to the losses on invested capital. Certainly much of the demand formerly supplied by large plants is already being satisfied by smaller producing units of one type or another.

The tendency toward the concentration of governmental power which we have witnessed in the recent activities of the Federal government and which would be accentuated by the passage of proposed Federal legislation, follows naturally and perhaps inevitably the trend toward bigness in business. Here the advantages of large size, if time should prove that they really are advantages, are different from those possessed by big business. Government does not depend entirely for its continued existence on the buying habits or abilities of those who support it, nor is it required to curtail its services so severely under conditions which seriously hamper the conduct of business. The absence of the profit motive makes it unnecessary that expenses should justify themselves on a balance-sheet. New services are added on the basis of a real or imagined social need and are not required to show a profit or even to pay their way.

This trend toward bigness in government, or toward the concentration that is the precursor of bigness, is due in part to the abuses that have too often

been associated with the conduct of big business and that made regulation by a strong central government necessary, but chiefly, we should say, to the advantages which accrue, as in the case of business, from unified direction, coördinated planning and efficient organization. As among nations, so among the political subdivisions of governments, there is a strong tendency toward consolidation and the resulting elimination of petty organizations.

The answer to the question of which is more desirable, bigness or smallness, will be found, in business as in government, somewhere between the two extremes of complete unity and complete dispersion, and will doubtless be different in different cases. We see no reason to object to increasing concentration in business, if, by reason of it, business is able to render a superior service, to extend its usefulness, and to perpetuate the advantages that are peculiar to capitalistic production. Nor do we see any valid reason for opposing greater concentration of power in government, if it results in greater social gains, greater administrative efficiency and a wider diffusion of economic opportunities. In each case the point beyond which it may be inadvisable to tolerate increasing concentration will be determined by the law of diminishing returns. When the disadvantages exceed the gains, the wisdom of retarding the trend will be apparent. As yet we have seen no evidence that would indicate that this point has been reached, either in business, where the trend has long been visible, or in government, which is following much the same development pattern after a delayed beginning. But, in either case, the change will bear watching, for an uncontrolled expansion of political power and supervision on the part of government may be just as dangerous to public well-being as an uncontrolled expansion of economic power and industrial organization on the part of business.

The fact that the tendency toward the design of ever larger machine units has received a setback, due to the criticism of engineers who question the reality of their alleged advantages, does not mean that a similar reversal of opinion will follow on the subject of the best size of a business. Individual machine units and even individual producing plants, in our field as well as in other industries, may decrease in size while the business organizations which own and operate them may continue to grow. Such a growth on the part of the financial and administrative staff may be essential to the maximum utilization of the possibilities for more profitable production that seems to be attainable with smaller producing units.

In our own field we expect to see an increasing number of smaller producing plants and an increasing number of larger producing companies. The first belief is based on the expectation that the demand for the products of our industries, particularly aggregates, will become more and more widely dispersed and that, on this account, large plants will become less and less able to meet the competition offered by smaller but no less efficient units. The second belief is based on the expectation that the advantages of big business will accrue to producers in our industries as they have accrued to producers in other industries, and that, under the more highly competitive conditions of the years to come, greater efficiency and greater economies will be as necessary in the administrative as in the productive functions of business.

Attacking the Silicosis Racket

THE St. Louis newspapers recently reported an action that we hope will ultimately prove to be the termination of the silicosis racket. On July 24 the Bar Committee of the Eighth (St. Louis) Judicial Circuit filed a petition for the disbarment of four lawyers who, it is alleged, since 1929 have conspired to engage in unprofessional and unethical practice of law in silicosis and other cases. If the charges should prove to be well founded and the lawyers should be disbarred, the probabilities of winning silicosis damage suits based on false allegations should be greatly reduced.

Silicosis is a disease which lends itself to the laying of fraudulent claims for damage. Some of its symptoms are easily feigned and it is easy to impose upon the sympathies of the average jury. These favorable opportunities have doubtless tempted many lawyers to accept borderline cases and even, as is alleged in the present case, to create an apparently genuine foundation for claims which are known to be false.

There are plenty of cases of genuine silicosis, cases in which the plaintiffs have suffered real damage as the result of having been exposed to the dangerous effects of inhaling silica dust, and in many of these the sufferers have been awarded compensation in large amounts. The number of such cases is not likely to decrease unless means for confining the dust or otherwise protecting workers from it are more generally used. Most employers are undoubtedly anxious to do all they can toward preventing the development of silicosis symptoms in their workers, but there are still many plants where conditions could be greatly improved, even if the dangers of exposure could not be easily or at reasonable cost removed.

The practice of attempting to collect damages on the basis of fraudulent claims must be stopped. Employers who feel that they are or have been exposed to the attacks of unscrupulous lawyers working under the cover of what are made to appear proper claims for silicosis damage should spare no pains to expose the fraud, if it can be shown to exist. In doing so they will not only protect their own interests but will also contribute greatly to the discouragement of a practice that has become all too common. The publicity given to fraudulent cases will act as a strong deterrent to prospective clients, to whom the expectation of financial gain may otherwise be too powerful to be successfully resisted, and it will also apprise those from whom jurymen are drawn of the dangers of relying too implicitly on, and of listening too sympathetically to, pleas that may have all the appearances of genuineness and yet be founded on nothing more real than a chain of carefully linked falsehoods.

Trends in Employment and Productivity of Labor in Cement Industry

By H. H. HUGHES, E. T. SHUEY and W. W. ADAMS
Division of Mineral Resources and Economics, U. S. Bureau of Mines

ALTHOUGH production declined to the lowest level in 25 years, the total number of wage earners in the cement industry increased from 1932 to 1933 as a result of the general adoption throughout the industry of the 36-hr. week and the 6-hr. shift. The actual number of man-hours worked, however, dropped sharply, and the output of cement per man-hour of employment in 1933 was virtually unchanged from 1932. Employment continued to increase in 1934, for the index of employment compiled by the Bureau of Labor Statistics advanced 20 per cent., from 41.1 in 1933 to 49.3 in 1934. These indexes are calculated on the basis of the 1923-1925 average taken as 100.

The lack of adequate statistics to show the relationships between employment and production has hampered the making of studies of economic problems in various branches of the mineral industry. Data on the productivity of labor in coal mining and iron-ore mining are available, but for other mineral products only miscellaneous facts have been collected. For several years the cement industry, coöperating in a program of accident-prevention, has reported employment statistics to the Bureau of Mines. In collaboration with W. W. Adams of the Section of Employment Statistics the employment record for the 6-yr. period 1928-1933, has been correlated with statistics of production. The following discussion and tables, summarizing the results of this study, illustrate the sharp effect of the depression on operating activity and employment in the cement industry and present for the first time data that should be given careful consideration in connection with any labor provisions affecting the industry.

Output Per Man.—In 1928, the "peak" year of cement production, 31,295 men worked a total of 10,137,187 man-shifts and 96,541,428 man-hr., an average of 9.5 hr. per man per day for 324 days. These employees accounted for the production of 157,121,800 bbl. of cement, an average of 15.50 bbl. per man-shift and 1.63 bbl. per man-hr. In 1933 the employment totaled 19,536 men, a drop of 38 per cent. from 1928, but the average man worked only 196 days a year and 7.3 hr. a day. The total man-shifts and man-hours, therefore, dropped 62 per cent. and 71 per cent., respectively, from 1928. The average shift dropped 23 per cent. from 9.5 hr. in 1928 to 7.3 hr. in 1933, but the output per man per shift declined only 5 per cent. At the same time the average output per man per hour increased 23 per cent., from 1.63 bbl. in 1928 to 2.01 bbl. in 1933. (See Table I.)

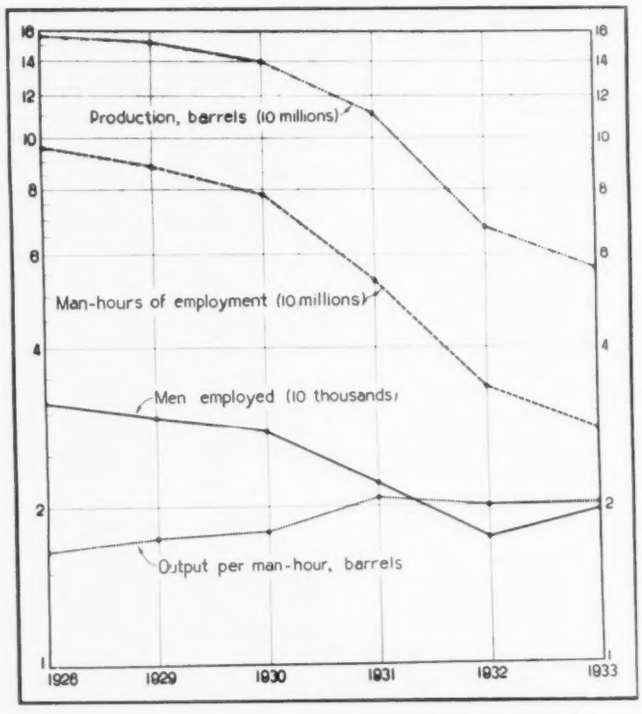


Fig. 1. Trend in employment in cement industry, production of cement, and output per man-hour, 1928-1933. Data are plotted on a logarithmic scale to show percentage-change relationships in their proper perspective.

Table I.—EMPLOYMENT IN THE CEMENT INDUSTRY, FINISHED CEMENT PRODUCED AT MILLS INCLUDED IN THE STUDY, AND AVERAGE OUTPUT PER MAN IN THE UNITED STATES, 1928-33

Year	Employment					Production			Percentage of Industry Represented[1]
	Average Number of Men	Time Employed				Finished Portland Cement (*bbl.*)	Average per Man (*bbl.*)		
		Average Number of Days	Total Man-Shifts	Man-Hours			Per Shift	Per Hour	
				Average per Man per Day	Total				
1928	31,295	324	10,137,187	9.5	96,541,428	157,121,800	15.50	1.63	89.1
1929	29,274	319	9,345,890	9.5	88,528,269	152,116,204	16.28	1.72	89.1
1930	27,775	308	8,562,897	9.2	78,771,352	140,771,728	16.44	1.79	87.3
1931	22,036	279	6,146,564	8.8	53,833,283	111,501,887	18.14	2.07	88.9
1932	17,440	231	4,020,861	8.4	33,799,409	67,449,096	16.77	2.00	87.9
1933	19,536	196	3,835,657	7.3	28,048,172	56,463,620	14.72	2.01	89.0

[1]Calculated for each year by dividing the quantity of finished cement produced at the mills included in the study by the total production.

Table II.—MILL EMPLOYEES IN THE CEMENT INDUSTRY, FINISHED CEMENT PRODUCED AT MILLS INCLUDED IN THE STUDY, AND AVERAGE OUTPUT PER MAN IN THE UNITED STATES, 1928-33

Year	Employment, Cement Mills Only					Production			Percentage of Industry Represented[1]
	Average Number of Men	Time Employed		Man-Hours		Finished Portland Cement (*bbl.*)	Average per Man (*bbl.*)		
		Average Number of Days	Total Man-Shifts	Average per Man per Day	Total		Per Shift	Per Hour	
1928	25,122	332	8,346,570	9.5	79,226,232	157,121,800	18.82	1.98	89.1
1929	23,755	328	7,791,270	9.4	73,405,571	152,116,204	19.52	2.07	89.1
1930	22,271	320	7,132,322	9.2	65,524,129	140,771,728	19.74	2.15	87.3
1931	17,309	294	5,086,328	8.7	44,502,808	111,387,566	21.90	2.50	88.8
1932	13,551	243	3,290,962	8.4	27,563,197	67,102,383	20.48	2.45	87.8
1933	15,075	206	3,103,654	7.3	22,592,150	56,454,620	18.19	2.50	88.9

[1]Calculated for each year by dividing the quantity of finished cement produced at the mills included in the study by the total production.

These data cover 129 plants representing about nine-tenths of the total production; the exact coverage ranged from 87.3 per cent. in 1930 to 89.0 per cent. in 1930 and 89.1 per cent. in 1928 and 1929. The total number of plants which reported production ranged from 143 in 1933 to 163 in 1929.

From 1928 to 1933 the general decline in man-hours of employment was slightly greater than the drop in production because of the increase in the output of cement per man-hour worked (Fig. 1). This increase in the productivity of labor reflects improved technique and increased efficiency of operation. The actual output per man per hour reached a "peak" of 2.07 bbl. in 1931 and then slumped slightly in 1932 and 1933. Efforts to maintain employment through reduction in the length of the work-week and the work-day are shown by the increase from 1932 to 1933 in the number of men employed.

Mill Employees.—The data on employment are broken down to show separately quarry, crusher, mill, and miscellaneous employees. The mill employees at an average cement plant outnumber the quarry and crusher employees more than four to one. In 1928 the average mill employee worked 9.5 hr. a day for 332 days and produced 1.98 bbl. of cement per hr.; in 1933 he worked only 7.3 hr. a day for 206 days but produced 2.50 bbl. of cement per hr. Despite the shorter shift the average output of 18.19 bbl. per man-shift in 1933 was only slightly less than the corresponding output of 18.82 bbl. in 1928. (See Table II.)

Quarry and Crusher Employees.—Data on the tonnage of quarry rock and overburden handled by quarry and crusher employees are also available for most cement plants beginning with 1929. The average quantity of material handled per man-hour of employment increased from 3.20 short tons in 1929 to 4.01 tons in 1931 and then slumped to 3.47 tons in 1933. The percentage of overburden included in the total material handled declined stead-

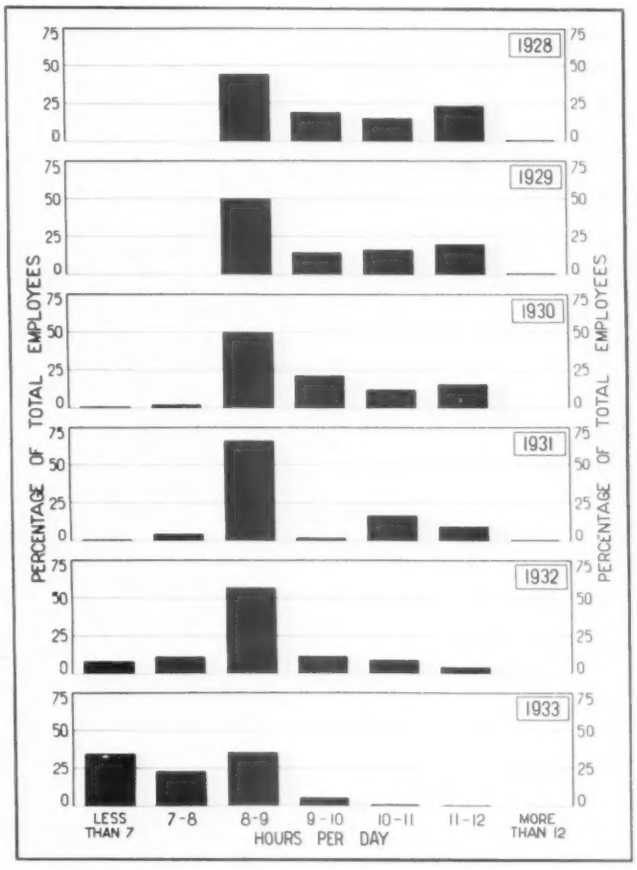


Fig. 2. Employment in cement industry, classified according to hours of labor per day, 1928-1933.

Table III.—QUARRY AND CRUSHER EMPLOYEES IN THE CEMENT INDUSTRY, MATERIAL (QUARRY ROCK AND OVERBURDEN) HANDLED AT QUARRIES INCLUDED IN THE STUDY, AND AVERAGE OUTPUT OF MATERIAL PER MAN IN THE UNITED STATES, 1929-33

Year	Employment, Quarry and Crusher Only					Material Handled, Quarry Rock and Overburden				Percentage of Industry Represented[1]
	Average Number of Men	Time Employed		Man-Hours		Amount (*short tons*)	Percentage of Overburden Included	Average per Man (*short tons*)		
		Average Number of Days	Total Man-Shifts	Average per Man per Day	Total			Per Shift	Per Hour	
1929	5,123	281	1,441,964	9.6	13,779,252	44,113,986	15.3	30.59	3.20	78.1
1930	4,939	256	1,264,000	9.1	11,536,403	40,413,300	13.4	31.97	3.50	76.3
1931	4,141	225	929,924	8.8	8,221,384	32,991,564	10.0	35.48	4.01	82.1
1932	3,480	185	643,113	8.6	5,505,342	19,662,583	7.8	30.57	3.57	83.2
1933	3,954	165	651,458	7.4	4,827,640	16,741,818	7.5	25.70	3.47	83.7

[1]Calculated for each year by dividing the quantity of finished cement produced at the mills included in the study by the total production.

Table IV.—NUMBER OF MEN EMPLOYED IN THE CEMENT INDUSTRY AND OUTPUT PER MAN-HOUR CLASSIFIED ACCORDING TO HOURS OF LABOR PER DAY, 1928-33

Hours per Day	1928			1929			1930		
	Men Employed		Production per Man-Hour (*bbl.*)	Men Employed		Production per Man-Hour (*bbl.*)	Men Employed		Production per Man-Hour (*bbl.*)
	Number	Percentage of Total		Number	Percentage of Total		Number	Percentage of Total	
Less than 7							129	0.5	2.67
7 and less than 8							389	1.4	3.55
8 and less than 9	13,205	42.2	1.80	14,504	49.6	1.91	13,785	49.6	1.85
9 and less than 10	5,924	18.9	1.70	3,873	13.2	1.91	5,809	20.9	1.89
10 and less than 11	4,851	15.5	1.52	4,896	16.7	1.51	3,430	12.4	1.71
11 and less than 12	7,167	22.9	1.43	5,731	19.6	1.46	4,233	15.2	1.49
More than 12	148	0.5	1.43	270	0.9	1.70			
	31,295	100.0	1.63	29,274	100.0	1.72	27,775	100.0	1.79

Hours per Day	1931			1932			1933		
	Men Employed		Production per Man-Hour (*bbl.*)	Men Employed		Production per Man-Hour (*bbl.*)	Men Employed		Production per Man-Hour (*bbl.*)
	Number	Percentage of Total		Number	Percentage of Total		Number	Percentage of Total	
Less than 7	113	0.5	2.12	1,320	7.6	1.97	6,802	34.8	2.25
7 and less than 7	894	4.0	2.05	1,907	10.9	2.27	4,467	22.9	2.06
8 and less than 9	14,633	66.4	2.19	9,946	57.0	2.03	6,875	35.2	1.89
9 and less than 10	477	2.2	2.10	1,946	11.2	2.14	1,006	5.1	1.65
10 and less than 11	3,698	16.8	1.86	1,467	8.4	1.66	215	1.1	1.63
11 and less than 12	2,133	9.7	1.78	854	4.9	1.43	171	0.9	0.83
More than 12	88	0.4	1.29						
	22,036	100.0	2.07	17,440	100.0	2.00	19,536	100.0	2.01

ily from 15.3 per cent. in 1929 to 7.5 per cent. in 1933. Curtailment during the depression period of quarry development work in advance of actual operations may account for the drop in the relative quantity of overburden handled. (See Table III.)

Hours Per Day.—From 1928 to 1933 there was a definite trend toward shorter hours. In 1933 more than one-half of the labor force worked fewer than 8 hr. a day and 93 per cent. worked fewer than 9 hr. In 1928 and 1929, however, no employees worked fewer than 8 hr. a day; in 1928, 39 per cent. of the total worked 10 hr. a day or longer. (See Table IV and Fig. 2.)

In general, throughout the period from 1928 to 1933 the output of cement per man-hour worked was higher for employees working short shifts than for those working longer hours. In 1933, for example, the group of employees, 35 per cent. of the total, who worked fewer than 7 hr. daily produced 2.25 bbl. of cement per man-hr., 23 per cent. who worked 7 to 8 hr. produced 2.06 bbl. per man-hr., and 35 per cent. who worked 8 to 9 hr. produced only 1.89 bbl. per man-hr. Further declines are shown by the groups of employees working more than 9 hr. but the number of men in each group is too small to be representative of the cement industry as a whole.

In considering these data, however, it should be noted that nothing is known of the relative efficiency of the plants represented by the various groups of employees. If the plants working short hours are generally more efficient than the average, the output per man-hour would of course be relatively high. Further study is necessary to clarify the relationship between the hours of employment and the output per man.

Estimated Total Employment.—Estimates of the total number of men employed and the total number of man-hours of employment in the cement industry are summarized in Table V. They are based on the assumption that the conditions of employment in the rest of the industry were the same as in the plants included in this study, which accounted for approximately nine-tenths of the total output of finished cement. Employment declined from an estimated total of more than 35,000 workers in 1928 to fewer than 20,000 in 1932 and then increased to about 22,000 in 1933.

For 1929 and 1931 these estimates check closely with the totals reported by the Bureau of the Census. In 1933, however, the Bureau of Mines figure shows an increase from 1932 in the number of men employed, whereas the census figure is considerably lower. This apparent discrepancy in the two figures reflects the difference in statistical procedures employed. The Bureau of Mines asks for the average number of men employed at each mill during the actual period of operation. For example, a plant employing 200 men may operate only 60 days during the year, but the entire 200 men are included in the total employment figure. The Bureau of the Census, on the other hand, averages monthly totals of employment to arrive at an average for the year. The Bureau of Mines figure, therefore, shows the number of men actually employed by the cement industry during the year, even though some may have worked only a short period, whereas the census figure is more closely representative of the number of men to whom the industry

(*Continued on page 30*)

Table V.—ESTIMATED TOTAL EMPLOYMENT IN THE CEMENT INDUSTRY, 1928-33

Year	Included in Study			Estimated Total	
	Employees	Man-Hours	Percentage of Total Finished Cement	Employees	Man-Hours
1928	31,295	96,541,428	89.1	35,100	108,300,000
1929[1]	29,274	88,528,269	89.1	32,900	99,300,000
1930	27,775	78,771,352	87.3	31,800	90,300,000
1931[1]	22,036	53,833,283	88.9	24,800	60,500,000
1932	17,440	33,799,409	87.9	19,800	38,500,000
1933[1]	19,536	28,048,172	89.0	22,000	31,500,000

[1] The Bureau of the Census reported 33,368 wage earners in the cement industry in 1929, 24,317 in 1931, and 15,829 in 1933.

Three of the four floating concrete-mixing plants being used in the construction of the T.V.A. General Joe Wheeler Dam near Florence, Ala. Barges of aggregates shown being brought to the job.

Four Identical Floating Mixing Plants Make Concrete for Wheeler Dam

Gravel Dredged from Tennessee River Taken in Barges 55 Miles to Dam Site

By W. E. TRAUFFER

THE General Joe Wheeler Dam, second of the major engineering projects being undertaken by the Tennessee Valley Authority, is rapidly nearing completion. The pouring of concrete was begun in August of 1934 and, it is expected, will be finished in the spring of 1936. The Wheeler Dam is an entirely different type of structure from Norris Dam. It was designed by the Bureau of Reclamation and is of the long low-head type. Norris Dam is intended to regulate the river flow and also generate hydroëlectric power. Wheeler Dam will be 50 ft. high and about 6,000 ft. long and between 600,000 and 700,000 cu.yd. of concrete will be used in its construction. Norris Dam is 1,872 ft. long and 253 ft. high and will require nearly 1,000,000 cu.yd. of concrete. The General Joe Wheeler Dam site is on the Tennessee River 15½ mi. above the Wilson Dam at Muscle Shoals, Ala.

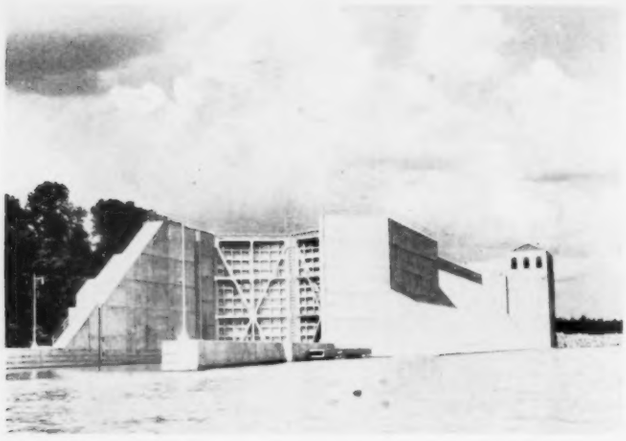
The methods used in the production of aggregates and in the mixing of the concrete for Wheeler Dam are of unusual interest to commercial producers of these materials. Unlike the case of Norris Dam, the aggregates for the Wheeler Dam are being supplied by a commercial producer. While the floating concrete-mixing plants are operated by the T.V.A., they are radically different from the more conventional type of mixing plant used at Norris Dam. Each of these plants is capable of producing 50 cu.-yd. of concrete per hr.

The contracts for the first 100,000 bbl. of cement for Joe Wheeler Dam, about one-sixth of the total requirements, were let March 30, 1934. These contracts were divided among the Lehigh Portland Cement Co., the Alpha Portland Cement Co. and the Cumberland Portland Cement Co. and called for delivery to the job in barges. A "modified" Portland cement, which has a heat rise, when incorporated into concrete, somewhat less than that of standard Portland cement and somewhat higher than that of low-heat cement of the type used at Boulder Dam, is specified. This cement, known to the T.V.A. as type B, is ground fine enough so that about 98 per cent. passes a 200-mesh sieve. This fine grinding is said to offset any tendency toward a lowering of strength due to its low-heat qualities. Tests of concrete made to date indicate that the strengths are equal to, or even slightly higher than, those that would be expected from a "normal" Portland cement.[1]

The sand-and-gravel contract for building the dam was awarded April 28, 1934, to the Cumberland River Sand Co., of Nashville, Tenn. It calls for between 1,000,000 and 1,400,000 tons of aggregates delivered on barges at the dam site.

The cement used in the construction of the Joe Wheeler dam is shipped from the mills by railway

[1] For a detailed description of this cement and the results obtained with it see P. J. Freeman, *The Present Status of Type B Cement After One Year's Experience*, PIT AND QUARRY, July, 1935, Vol. 28, No. 1, pp. 35-38.



The completed navigation lock at the north end of Wheeler Dam.

to a point on the south bank of the Tennessee River in Sheffield, Ala., where it is transferred to barges. These are then towed through the locks and up the river to the dam site, a distance of about 15 mi. It is estimated that about 3,000 bbl. of cement are now being handled daily. The cement is handled directly from the barges into the batchers serving the mixers at the dam. The arrangement for rehandling the cement from the cars to the dam site is operated through an agreement by the three companies furnishing the cement for the dam.

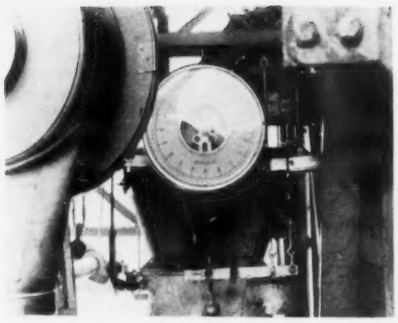
The sand and gravel being used in the construction of Joe Wheeler Dam are being dredged from the Tennessee River about 55 mi. below the dam. The dredge "Kentucky," which was formerly operated in the Ohio River near Louisville, is used and a capacity of about 400 tons per hr. is obtained. This is a bucket-ladder dredge having a 100-foot. digging ladder with 4½-cu.ft. buckets. Gravel is discharged over a 7-in. stationary grizzly which returns any oversize to the river. The "throughs" (minus 7-in.) are discharged to a second elevator which is similar to the first but of lighter construction and operates on 50-ft. centers.

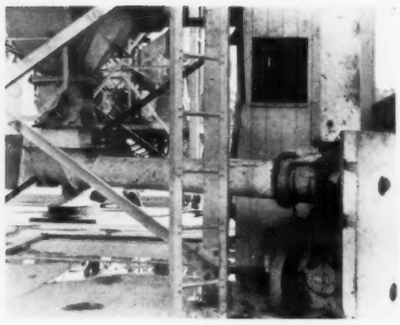
A single-deck 4-ft. by 8-ft. Simplicity vibrating screen fitted with 3-in. perforated plate receives the elevator discharge. The "oversize" (3-in. to 7-in.) is chuted to a No. 7 Allis-Chalmers Newhouse crusher set at 2 in. The crusher product is taken by a short elevator to a point below the screen, where, together with the minus 3-in. material from the screen, it is raised by a 60-ft. bucket-elevator to the sizing screens. The material is split to two 4-ft. by 8½-ft. triple-deck Robins Gyrex screens. These have wire cloth with 1¾-, ⅞- and ⅜-in. openings on their decks. The material pasing through the lower decks is chuted to a double-deck Simplicity vibrating screen on which a single deck with 3/16-in. wire cloth is now being used. The sand is discharged to a sump tank.

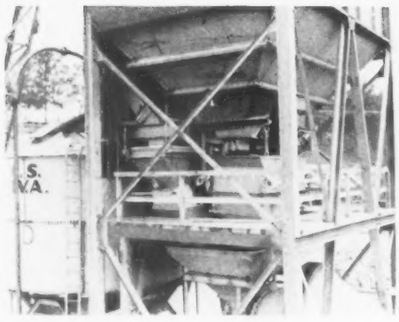
Four barges are loaded at one time, two on each side of the dredge. The 1½-in. to 3-in. gravel is chuted to the outer barge on one side and the inner barge on that side is loaded with ¾-in. to 1½-in. material by a 36-in. belt-conveyor. On the other side of the dredge the ¾-in. gravel is elevated to a height which allows it to be chuted to the outer barge on that side. Sand is reclaimed from the sump by a dewatering elevator and is chuted to the inner barge.

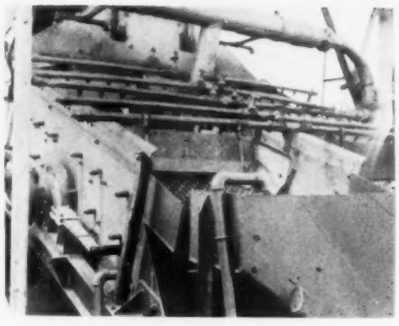
The dredge was designed and the original equip-

General view of General Joe Wheeler Dam from the south with the completed navigation lock in the background.









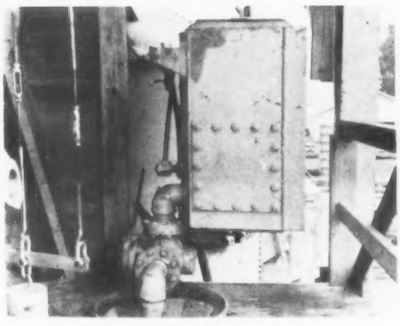
Lower left: The two vibrating washing screens on the dredge "Kentucky."

Upper left: Scales and batchers at mixing plant.

Above: Cement feeder, screw-conveyor and elevator.

Upper right: Cement and aggregate bins with batchers and mixer below.

Lower right: Water-measuring tank which is calibrated by gallons.



ment furnished by the Dravo Contracting Co. It is steam-powered with Skinner Uniflow engines. One 150-hp. engine operates the three ladders, and another of the same size two centrifugal water pumps and a 50-kw. generator. Smaller engines drive a 25-kw. generator for operating the welder when the boat is not in operation, a 1½-kw. generator for lights, etc., the four spuds and the capstan. These spuds are 62 ft. long and 3 ft. square and weigh 16½ tons each. A 120-hp. Cooper-Bessemer Diesel engine drives a 75-kw. a.-c. generator which supplies power for the crusher and its elevator. The crusher, elevator and Robins screens were installed early in 1934.

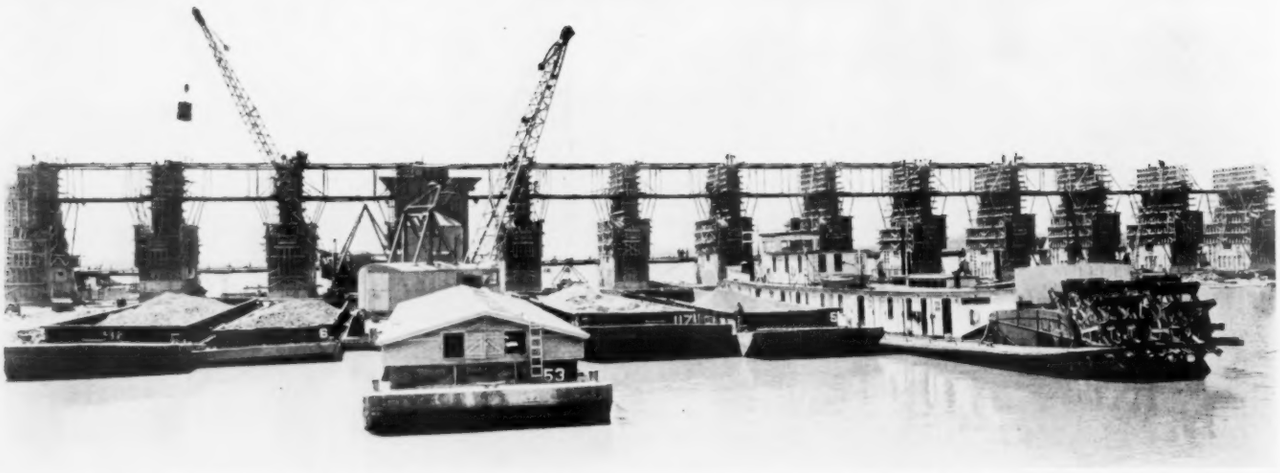
The gravel barges are 135 ft. long, 28 ft. wide and have hulls 8 ft. deep. Each has a capacity of 750 tons. The loaded barges are pushed by two 450-hp. steamboats and two 350-hp. Diesel-engine boats in tows of 2 to 3 barges, a distance of about 38 mi. upstream to a yard which has been established on the river bank just below the first lock at Florence. Here approximately 50,000 tons of aggregates have been stock-piled to insure against a shortage of material due to a breakdown on the dredge or to other reasons. When the river is low, the barges can not be loaded to their capacity at the dredge and additional material is added at the stock-pile as the water level is constant from this point onward. Rehandling is done by an American steam whirler, with a 100-ft. boom and a 2-cu.yd. Blaw-Knox clam-shell bucket, which can also rehandle the material from one barge to another if desired. A Koehring gasoline crawler crane with a 1½-cu.yd. Blaw-Knox bucket is also used. There are three locks below the Wilson Dam and these have a total lift of 130 ft. After passing these the barges are towed an additional 15 mi. on Lake Wilson to the General Joe Wheeler dam site.

The four identical floating plants which mix and place the concrete for the dam were assembled on the job and began operation in August, 1934. Each plant consists of a 40-ft. by 90-ft. steel barge, which was made by the Ingalls Iron Works Co. and on which are mounted the bins, conveyors, batchers, mixers, cranes, cement pumps and other equipment.

Each mixer barge operates entirely independently of the others and is tied up at right angles to the cofferdam. Stations every 300 ft. along the cofferdam make power available at all points. Reduction from 2,300-v. current to 440-v. is accomplished on the mixer barge, where a switchboard controls all operations. Cutler-Hammer starters and General Electric transformers, switches and motors are used. Lidgerwood capstans are used to move the barges at the cofferdam and four spuds hold each of the mixer barges in place. The spuds are handled by a hook on the barge crane.

Two aggregate barges are tied up on each side

One of the floating mixing plants tied at shore.



One of the floating mixing plants surrounded by aggregate and cement barges. One of the towboats is at right.

of the mixer barge and parallel to it, one containing sand and the other three sizes of coarse aggregate. The cement barge is tied up to the end of the mixer barge. Cement is unloaded from the barge by a 5-in. Fuller-Kinyon Type B portable pump which discharges it through a 4-in. line into a Blaw-Knox 500-bbl. steel bin on the mixer barge. Each pump is driven by a 40-hp. motor and has a capacity of 100 bbl. per hr. An American Hoist & Derrick Co. Revolver electric crane, equipped with a 75-ft. boom and a 2-cu.yd. Blaw-Knox clam-shell bucket, is mounted on the barge and unloads the aggregates into a Blaw-Knox 4-compartment steel bin having a total capacity of 150 tons. As there are four separate and identical mixing barges, all the equipment mentioned as part of the single barge described—cement pump, crane, bin, etc.—is duplicated on the other three barges.

Cement is discharged from its bin through a rotary gate into a 10-in. horizontal screw-conveyor which carries it to a vertical screw-elevator. Both the screws are driven by the same 10-hp. motor. The elevator feeds the cement through a chute into a 2,000-lb. weigh-batcher equipped with a Kron springless dial scale. A gate in this chute controls the flow of cement to the batcher. Opening the gate starts the motor driving both screws and closing the gate stops it. Foundry Supplies Mfg. Co. electric vibrators keep the cement from sticking in the bins and weigh-batchers.

Gravel is recovered from the bin through lever-controlled clam-shell gates under each compartment. These feed a weigh-batcher of 100-cu.ft. capacity equipped with a 10,000 lb. Kron dial scale. The dial of this scale has adjustable markers which can be set so that the four sizes of aggregates in a mix can be weighed continuously in the desired proportions.

Water is measured in a 100-gal. tank having a 3-way valve which prevents water from entering while the tank is discharging and *vice versa*. This tank is equipped with a gage glass and a discharge gage calibrated to show gallons. Water is fed to it through an inlet pipe in the hull and a 75-gal.-per-min. Goulds centrifugal pump.

Both weighing batchers and the water tank discharge their contents directly to the Norris K. Davis 56-S mixer. This is equipped with a National Equipment Co. batchmeter and an automatic dumping arrangement. The concrete is discharged from the mixer into a Union Iron Works 2-cu.yd. bottom-dump concrete bucket. Cranes on the cofferdam pick up these buckets and place the concrete where desired. Six full-revolving traveling gantry cranes supplied by the Clyde Sales Co. are used for this purpose. All bins, screw-conveyors, batchers and tanks on the mixer barges were supplied by the Blaw-Knox Co.

The dredge "Kentucky" which supplies all aggregates for General Joe Wheeler Dam.

Cement Labor (from page 26)

could have provided full-time employment throughout the year.

The average employee included in the Bureau of Mines estimated total for 1933 worked 7.3 hr. a day for 196 days. The estimated total number of man-hours of employment amounted to 31,500,000, a decline of 18 per cent. from the estimate for 1932. This drop is comparable to the decline in the average number of men employed as reported by the Bureau of the Census.

When Are Employees Entitled to Damages for Contracting Silicosis?

By LEO T. PARKER
Member of the Ohio Bar

FREQUENTLY the outcome of a litigation depends upon testimony as to the stages of the disease of silicosis. Generally speaking, it is admitted that silicosis is a condition of the lungs brought about through the inhalation of certain forms of dust, such as silica dust, and that it has three stages. The first and second stages are not the most severe forms. During the first stage no bad results will be expected, if the employee changes his occupation. During the second stage he should not work, although he may be able to do so, as in this stage tuberculosis infection is present. Many physicians say that when silicosis reaches a certain stage, the end result is inevitable, that is, there is no cure. Apparently deterioration progresses more rapidly in some individuals than in others, and in some cases the disease may be present for several years.

For this reason it is difficult to decide when the disease was contracted. Various courts have held that unless the date when the employee is disabled from rendering further service be taken as the date that determines liability, it will be very difficult to administer the workmen's compensation act, so far as disability resulting from occupational disease is concerned. The protection of the rights of both the employer and the employee requires that liability be fixed as of that date. If liability must be determined as of the date when the disease had its inception, the employee would be under the necessity of giving notice of every slight ailment, which might be the incipient stage of some occupational disease that might cause disability at some more or less distant future time.

In view of these various facts some courts have held that in order to be entitled to compensation the employee must introduce testimony proving that he actually contracted the disease and was disabled by it while in the particular employment.

For example, in Kellar v. International Silica Co., the Circuit Court of Alexander County, Ill., it was shown that an employee filed suit against his employer alleging injury to his health and designated his disease as silicosis.

IN this, the second and concluding, part of his discussion of silicosis claims the author deals with the stages of silicosis, the classification of disabilities, the liability resulting from violation of state laws, the employer's duty to furnish a safe working place, the employer-employee relationship, the aggravation of preëxisting disease, and what constitutes an accident. His discussion is based on a study of important silicosis cases made on the editor's invitation and brings out important points that bear on the question of the genuineness of the claim for damages. A discussion of the insurance aspects of silicosis damage claims by H. R. Northrup appeared in the September, 1934, issue of PIT AND QUARRY.—EDITOR.

The employee stated that he was employed by the owner of his plant at Elco, Ill., for a period of five years and that, while so employed, he contracted the disease known as silicosis. The employee contended that the employer was liable particularly because he had failed to furnish proper equipment to consume the dust. However, since the employee failed to prove his case, the court refused to allow compensation and said:

"It was the impression of the court at the time that it was just as necessary to prove the employment for and during a sufficient length of time whereby the disease might be contracted, as it was to prove the alleged willful failure to provide the necessary equipment and appliances to prevent the contracting of such disease. . . . The evidence also is very uncertain as to whether the plaintiff (employee) did really contract silicosis or whether he had contracted the disease of tuberculosis or inherited in from contact with his father, it being shown that his father died of tuberculosis, as I now remember the evidence."

Disabilities Classified.—Various courts have held that death resulting from carbon-monoxide poisoning is an accidental death and is compensable. Also, death resulting from heat exhaustion constitutes an accidental injury within the meaning of the workmen's compensation law. In fact, any disease actually caused by reason of the particular kind of work at which the employee is employed is compensable.

On the other hand, an employee is not entitled to recover compensation where it is shown that he was suffering from a disease such as arteriosclerosis or a disease of the heart prior to the accident, and where there is an inference that the death was one that might have occurred in the *natural* progress of the disease. The latest higher court case involving this point of the law is Sinkiewicz v. Susquehanna Collieries Co., 75 Atl. 757.

In this case it was shown that an employee was

suddenly taken ill and complained of his condition, left his work and consulted a physician the same day and died early in the morning the day following the accident. Payment of compensation was refused on the ground that death was due to causes other than the inhaling of the gas. However, under the circumstances, since no evidence was introduced tending to prove that the employee had suffered from prior illness, the higher court held his dependents entitled to compensation and said:

"While the mere fact that the decedent was taken ill while on the premises of the defendant (employer) is not sufficient to support an award of compensation . . . the decedent before the accident was in good health. . . . These facts were accompanied by the testimony of the attending physician who testified that the cause of death was lack of oxygen and the inhalation of poisonous gas."

On the other hand, in all cases where the testimony does not indicate conclusively that such disease or disability positively was contracted during the employment, no compensation is allowable.

For example, in Liberg v. Genessee Co., 38 Pac. (2nd) 999, it was disclosed that an employee worked in a place where dust was plainly visible to the eye and was inhaled and caused him to cough and sneeze a great deal. One day the employee continued with his work until the regular quitting time at about 5 o'clock in the afternoon of that day, when he went to his home and had his supper. At about 10 o'clock in the evening of that day he began to feel nauseated and dizzy. He consulted a physician, who removed him to a hospital, where he submitted to an operation for the removal of his appendix.

The employee claimed that he was entitled to recover compensation, but he failed to prove conclusively that the disease of the appendix was caused by the inhalation of dust. Although the lower court held the employee entitled to compensation, the higher court reversed this decision and said:

"The burden is upon the claimant (employee) to prove both his disability and that the injury was caused by accident arising out of and in the course of his employment. . . . From a careful examination of the record, we are satisfied that the evidence is not sufficient to support the finding of the board The judgment is therefore reversed."

Violation of State Law Results in Liability.—It is well established that an employer is liable for an injury resulting to an employee, where it is shown that the former has violated a state statute, unless it is conclusively proved that the violation was justifiable.

On the other hand, an employee never is entitled to damages or compensation under the common law, or under state compensation laws, if the injury is sustained while the employee is doing any act not within the natural scope of his employment. The same law is applicable if the employee fails to exercise an ordinary degree of care to safeguard himself against injury. Sometimes there are enacted laws which are intended to hold employers liable for all injuries sustained by employees who perform unusually hazardous work. Such laws are valid, if they are reasonable.

For example, in Seabury v. Arkansas Corp., 130 So. 1, it was disclosed that a state law provides that all employers engaged in hazardous businesses shall be liable for all injuries sustained by employees. It was contended that this law is invalid. However, in upholding the validity of this law, the court said:

"It was clearly within the power of the legislature to make the principal engaged in a hazardous business liable to any workman employed in such business. . . . The act in this respect does not restrain the liberty and freedom of contract any more than it does in making the principal liable for injuries to workmen directly employed by such principal."

On the other hand, it is important to know that a contract by which an employer endeavors unreasonably to restrict payment of compensation for an injury is void. And, unless the industrial board approves a payment for compensation under state compensation laws, the agreement is void although the employee signs it. Moreover, a contract by which an employer endeavors to avoid liability by having his employees sign contracts not to sue for damages or compensation for injuries is void, if it is shown that the injury resulted from the negligence of the employer.

Duty to Furnish Safe Working Place.—It is well established that an employer is duty-bound, in the exercise of ordinary care, to provide a reasonably safe place in which his employees can work and to furnish them reasonably safe means and suitable appliances with which to execute their work, subject to the limitation that an employee assumes the ordinary care and circumspection.

Another important point of the law is that it is deemed negligence for an employer to furnish an appliance which is not reasonably safe to be used by an employee. Also, the employer is expected to use good judgment in making an effort to safeguard his employees against the contraction of diseases. Yet the law is settled that where an employee is supplied with anything having open and glaring defects, or his job is apparently dangerous, and a reasonably prudent person would not undertake to do the work, then the employee is deemed contributory negligent and he is not entitled to recover damages, although, of course, he may recover compensation under state laws.

Common Law and Statutory.—There are numerous circumstances under which an employer is liable for payment of compensation under the workmen's compensation laws, whereas he would not be liable under the common law for the same kind of injuries.

For example, under the common law an employer is not responsible for injuries which a workman inflicts accidentally to his fellow workman. However, the workman's compensation laws definitely specify the amount of compensation to which an injured employee is entitled, irrespective of the cause, provided the injury is sustained while the

employee is acting within the scope of the employment.

On the other hand, it frequently happens that injured employees prefer to sue for damages under the common law, rather than accept the amount of compensation fixed by workmen's compensation laws. This circumstance may occasionally exist where the disability resulted from negligence on the part of the employer, and the employee believes that a jury will allow a verdict for damages for an amount greater than the compensation authorized by the compensation laws.

However, almost all states have enacted laws which clearly specify that so long as the employer complies with the state compensation laws an injured employee can not sue for damages. But it is important to know that in all jurisdictions an employee who elects to file suit under the common law is barred from relying upon the workmen's compensation laws to obtain payment, should the suit terminate adversely for him, and *vice versa*.

Relation of Employer and Employee Must Exist.—Generally speaking, an employer is not liable either under the common law or the compensation laws for disability sustained by any person, unless the one claiming compensation proves to the satisfaction of the court that, when the injury or disease occurred, he was actually in the employ of the one being sued.

Whether the relation of employer and employee existed at the time of the injury depends upon the answer to the question: Was there an express contract, or did the acts show that the parties recognized one as the employer and the other as the employee?

The courts are in accord with the rule that the right of the employer to control an employee indicates the legal relation of employer and employee.

Also, the law presumes that where one person is employed to work on the premises of another to accomplish a benefit for the latter, the employee is a legal employee.

However, the fact that an employer pays a person at regular intervals does not indicate conclusively that he is an employee. Circumstances may exist under which a person receives payment for performing work, when in fact, he is not legally an employee. For example, a person who performs a special service for a stated compensation, and is permitted to perform the work in accordance with his own ideas is an "independent contractor," who is not entitled to compensation from the party for whom he is performing work. (165 N. Y. S. 42.)

Aggravation of Preëxisting Disease.—Considerable discussion has arisen from time to time whether an employee, who has previously suffered from a tubercular condition which was arrested when he took employment, may recover compensation when this condition is aggravated by inhaling silica dust. Also, the question often has arisen whether aggravation of a disease caused by the peculiar hazard of an occupation, as inhalation of silica dust, is an accident and whether the employee is entitled to payment of compensation under a state compensation law which authorizes compensation for "accidental injuries."

Various courts have held (300 Ill. 28) that if there is a preëxisting disease, the employee is entitled to recover for all the consequences attributable to the injury in the acceleration or aggravation of such disease. In other words, such aggravation or acceleration, permanent and progressive in its nature, will entitle the employee to compensation to the extent and in the proportion in which the preëxisting disease is increased or aggravated.

Therefore, if an accident results in a lesion or a new condition of which it is the proximate cause, there may be a recovery of compensation by the employee, regardless of predisposing conditions making him more susceptible to the injury.

These important points of the law were discussed in the late case of Beaver v. Morrison-Knudsen Co., 41 Pac. (2d) 605, reported March 29, 1935. The facts of this case are that a state law provides that compensation shall be paid under the provisions of the law to employees suffering from a disability caused by an accident arising out of the scope of the employment. An employee named Beaver appeared to be in good physical condition in 1928 at the time he became employed with a company. During 1928, 1929, 1930, and 1931 he worked intermittently in various capacities, including truck driving, general work, repair work, rock-crusher work, and hot-plant work. During the time of his employment he performed labor at or upon the rock crusher and hot plant three or four months in each of the years 1928, 1929, and 1930, when these units were operating. When the rock crusher and hot plant were operating thick clouds of dust were produced. In these the men were required to work, and the dust penetrated their clothing, covered the exposed parts of their bodies, and the breathing of it caused them to cough. This dust upon analysis was found to contain from 80 to 85 per cent. silica. Beaver worked in this dust during the times he was so employed and was more or less bothered by coughing, which became more frequent as time passed. In February, 1931, his cough became worse and he started spitting up blood and black particles and lumps. After February Beaver continued working for the company, but not upon the rock crusher or hot plant, and in July he suffered a hemorrhage, and thereafter his weight fell off. In October he consulted a physician, was placed in a hospital under observation and treatment, X-rays were taken of his chest, and his case was diagnosed as "acute tuberculosis." There is evidence that he suffered from no cold or any known illness during the time of his employment as above recited, and that he had no knowledge that there was such a thing as silica dust or that there was any danger in working in rock dust. Neither Beaver nor any one else realized that he was suffering from an arrested or latent case of tuberculosis until October or November.

Beaver applied for compensation under the state compensation laws. During the investigation evidence was introduced proving that prior to 1928 Beaver had been a farmer and in 1923 he had suf-

fered from a condition evidenced by knots, bumps, knobs, or nodules on his neck, which were at that time diagnosed by a doctor as cancerous. There was some evidence that he was suffering in 1923 from tuberculosis, and that in 1928, when he took employment with the company, his tubercular condition was in an arrested or latent state.

In view of this evidence the industrial board rendered its opinion disallowing the claim and said:

"That the said claimant (Beaver) had contracted tuberculosis earlier in his lifetime and long prior to the time of his first employment with the above said employer, and that the present attack of tuberculosis is a recurrence of the disease . . . that the same was not caused by his employment; . . . and there is no connection between it and the occupation which claimant pursued for his employer."

The employee appealed to the higher court. The counsel for the employer contended that Beaver was more or less bothered by coughing, which became more frequent as time passed, and that the ailment was brought on by a series of irritations, extending through three or four months, each year from 1928 to October, 1931, which definitely place the occurrence or injury outside the category of "accidents" as defined by the state law which authorizes payment of compensation to employees.

However, the counsel for the employee argued that the effect of inhaling or breathing silica dust merely aggravated a latent disease to an intensity which was in the nature of an accident, similar to the last heavy load causing an injury which had been brought on by continuous strain over a long period of time. It was argued that otherwise the employee would have remained in a healthy condition for many years.

During the trial the employee's physician testified in part as follows:

"The ordinary man will work in a mine for a good many years and seldom develops the disease, but when a man has had tuberculosis it is a different story. Silica is slightly soluble in the lung, and it causes a coal-oil silica. There are certain definite symptoms that are produced by irritation of dust particles that always occur before development of tuberculosis. There is bronchitis, or asthma, or, as we call it, chalicosis, always developed, because there has to be a history of a long period of irritation of the bronchi, and I believe there are authorities who question it even being a cause of tuberculosis."

After considering all testimony the higher court held Beaver entitled to recover payment of compensation and said:

"Now, briefly considering the evidence, we think it indisputable that the employee (Beaver) had previously suffered from tuberculosis and that he had recovered to that state and condition where the lung lesions had healed and the tubercles were inclosed and in a dormant state; he had resumed his work and had been, and was, able to go about his business as any other workman could do. . . . The testimony of a tuberculosis expert and of claimant's physicians is all positive and affirmative, to the effect that inhaling silica dust during his period of employment with respondent (employer) was the direct and specific cause of reviving the latent tubercular condition of claimant's lungs and causing his breaking down from a fatal case of tuberculosis. On the other hand, in the state of health he was in when he went to work for this company, still he would not likely have suffered any ill results had he not been working in the siliceous atmosphere. . . . He could not anticipate or foresee the result, neither could his employer. Now who can in truth and fairness say this was not a compensable 'accident'? In the light of our analysis of the facts and circumstances bearing upon the injury here involved, and the uniform purpose of this court to apply the law with a liberal construction in favor of compensating the injured workman, we are constrained to hold that in the case at bar the workman met with an 'accident' in the course of his employment and was entitled to compensation."

What Is an Accident?—One of the difficulties encountered in defining the word "accident" is to find terms which correctly indicate its meaning and which are not as greatly in need of definition as is the word itself. Obviously, the expression "accident" as used in the popular and ordinary sense of the word, denotes an unlooked-for mishap or an untoward event which is not expected or designed.

For example, in the recent case of Leach v. Grangeville, 41 Pac. (2d) 618, the wind blew dust into an employee's left eye, which immediately became inflamed and painful. Prior to the occurrence of this accident dust had blown into his left eye which caused it to become irritated and painful, but it subsided without causing loss of employment, and he did not consult a physician with respect to it. However, this last accident caused such an irritation that after a few weeks, the employee had to have his eye removed.

The counsel for the employer contended that getting the dust in the eye was not an accident of such a nature as to entitle the employee to recover compensation for the ultimate loss of the eye. Also, it was contended that sufficient definite proof was not given to show conclusively that the loss of the eye actually was caused by getting the dust in it.

Notwithstanding this argument, the higher court held the employee entitled to compensation for loss of the eye, and said:

"It is established, by preponderance of evidence, that the removal of respondent's (employee's) eye was made necessary by a condition which resulted from dust coming in contact with it while he was in the discharge of duties devolving on him in the course of his employment. It is not necessary that the facts on which an award is based be established beyond reasonable doubt. In a case of this kind the decision is to be made according to preponderance of evidence, and it is not incumbent on a claimant (employee) to establish the cause of his injury by proof of a higher degree than that, or to the exclusion of other possible causes."

Dredge of Andersen Sand & Gravel Co. with plant buildings in background.

Storage tower at left, blast sand, loading and crusher buildings at right.

New Blast-Sand Plant Erected to Utilize Product Wasted in Former Years

Michigan Producer Changes Production Facilities to Meet Changing Conditions

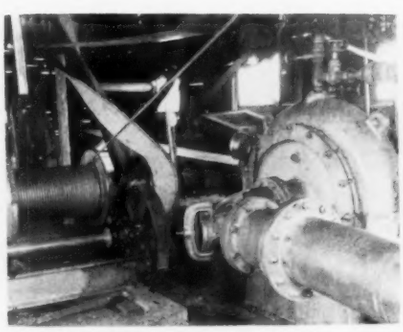
By W. E. TRAUFFER

ONE of the most interesting plants which the writer has had the privilege to inspect in recent years is that of the Andersen Sand & Gravel Co. near Juniata, Mich. Outstanding in this operation is the originality with which problems have been worked out and the manner in which the plant has been adapted to changing conditions. Frank N. Andersen, who is the owner of this plant and responsible for its design and operation, states that he has found it profitable to make changes whenever necessary in order to keep up with changes in customers' requirements.

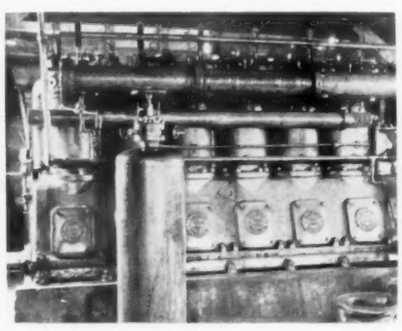
The original gravel plant went into operation in September, 1929. In 1930, according to Mr. Andersen, only 2 per cent. of the total output of the plant was shipped by motor trucks. In 1934 60 per cent. of the output was shipped in this manner. All truck shipments were made in hired trucks until 1934, when a 5-cu.yd. General Motors Model T51 truck was purchased. This hauls two 8-cu.yd. Fruehauf side-dump pneumatic-tired trailers. Early in 1935 an International 5-cu yd. truck was purchased and on it is mounted a Fruehauf 10-cu.yd. hydraulic rear-dump semi trailer to which is coupled an 8-cu.yd. Fruehauf side-dump trailer. Mr. Andersen has found that customers prefer direct delivery to the job even when this results in a slightly higher cost to them. Truck deliveries have been made as far as 68 mi. from the plant.

Another example of the advantage of conforming to conditions was the erection of a new concrete-and-steel plant building for the production of blast sand. This went into operation early in 1935 and has increased the total output considerably. It is also using a size of material of which a large proportion was formerly wasted.

There is a clay pit on the property and Mr. Andersen has developed a method for producing road gravel with a clay content of from 5 to 20 per cent. The company has built a special unit consisting of a hopper discharging on a Simplicity vibrating screen which discharges on an inclined belt-conveyor. A Continental gasoline engine drives this

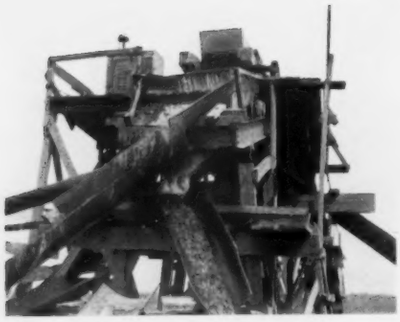


The ladder hoist and 8-in. pump on the dredge.



The 210-hp. Diesel engine which operates the dredge.

Method used to divert flow of waste from plant.



Washing screen over storage with gasoline engine drive.

The tower system of aggregate storage used at this plant.

Drag-line excavating clay pit for production of road mix.

equipment, all which is supported on a steel framework mounted on skids. Small pebbles are hauled from the plant and spread in windrows along the edge of the clay pit. A P&H crawler drag-line, equipped with a P&H light-weight ¾-cu.yd. bucket, drags clay from the pit and gravel from the windrows in approximately the proportions desired. The material is then screened and piled in windrows for later shipment. As the drag-line moves along the edge of the pit it drags the screening unit with it.

The property being worked consists of 60 acres located 6 mi. east of Vassar, Mich. It adjoins Michigan trunk highway M24 and is on the Saginaw-Port Huron Division of the Pere Marquette Ry. The entire property was thoroughly tested before the plant was built and it is estimated to contain enough aggregate for another 20 years of operation. The overburden averages less than 2 ft. in thickness and most of this is caved in with the gravel. About 10 ft. of the aggregate is above water-level and dredging has been carried to 40 ft. below water-level in some places. About 40 per cent. of the material is retained on a No. 4 screen and about 20 per cent. of this must be crushed in order to pass a 2-in. ring.

The dredge has a 20-ft. by 40-ft. steel hull which was electric-welded on the job. On this is mounted the superstructure housing the dredge pump, engine, etc., and the drive end of the dredging ladder. The steel A-frame supporting the suction end of the ladder is supported on two 5-ft. by 20-ft. welded-steel pontoons each 6 ft. deep. Two additional pontoons of identical construction are connected to them by steel channels and hold the guy wires supporting the A-frame. These pontoons are entirely separate from the dredge hull so that none of the dredging shock or motion is transmitted to it.

When built in 1929, this was a plain suction dredge with the 8-in. Amsco dredge pump driven by a 125-hp. Diesel engine. In 1933 this engine was replaced by a 210-hp., 6-cyl. Benz Diesel engine which was imported from Germany by the Chicago Pneumatic Tool Co. At the same time the W. H. K. Bennett 60-ft. Diamond cutting and screening ladder, made by the Pettibone Mulliken Co., was installed. The ladder was acquired primarily to increase the efficiency of the dredge pump and to increase the percentage of solids handled without

The screening and crushing plant with dredge in background. Scraper at left handles fines to blast-sand plant.

increasing the water flow. There is not enough large rock or compacted material in the deposit to have justified the installation of the ladder for this reason alone. This installation has justified itself by increasing the output of the dredge from 45 cu.yd. to the present average of 100 cu.yd. per hr., an output which is being obtained with a 630-ft. pipe-line discharging at a point 42 ft. above the pump level.

The Diesel engine which drives all the equipment on the dredge is installed near the rear end of the hull and had to be placed on a 12-deg. angle across the hull in order to balance it with the pump placed

Ten-cu.yd. truck hauling 8-cu.yd. trailer being weighed for shipment.

in the center. This arrangement put the main drive belt on an angle to the remainder of the machinery. This problem was solved by placing an old motor-truck universal joint on the line shaft from which all the equipment is belt-driven. Other equipment includes an American 1-drum hoist which operates the A-frame, a water pump and several hand-operated winches which handle the shore lines. A special foundation had to be built for the Diesel engine. This consists of 6-in. concrete walls connected by 4-in. concrete rib walls and is supported on 8-in. steel I-beams placed 3 ft. apart running lengthwise of the hull.

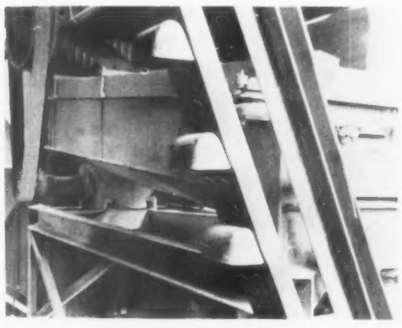
The blast-sand plant with drag-line operating scraper at left.

At the plant a baffle-box breaks the force of the dredge-line discharge. The first separation of the material is performed by a 40-in. by 20-ft. Telsmith revolving screen equipped with a jacket and sprays. This screen produces three sizes of coarse aggregate in addition to sand and pebbles. The water and sand are discharged into a settling box which allows regulation of the size but produces only one grade of sand at one time. This is discharged to a bin compartment. The water and waste material overflow through a 12-in. pipe to a waste pile near the plant. Because of the flatness of the property, trouble was experienced at first with the water flowing back toward the plant from this pile. This was overcome by cutting an opening in the bottom of the waste pipe near its discharge end. The coarsest material in the waste drops through this opening, building a pile which, with the assistance of a few boards, diverts the main discharge away from the plant.

The other three sizes of material coming from the revolving screen—usually ¼-in. to ¾-in., ¾-in. to 1¼-in., and 1¼-in. to 2-in. — are discharged directly into bin compartments. The oversize, plus 2-in., is chuted to a 10-in. by 20-in. Allis-Chalmers Blake-type jaw crusher. The crushed material is returned to the revolving screen by a belt-bucket elevator. A 45-hp. Continental gasoline engine drives the screen, crusher and elevator through flat belts. Plans for the future include the reconstruction of this building.

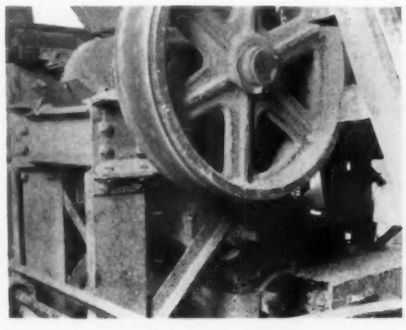
Truck and trailers which haul 21 tons of aggregate in one load.

The material stored in the bin is reclaimed from one compartment at a time by a 20-in. belt-conveyor which is set on 280-ft. centers and operates horizontally near ground-level alongside the bin and is then inclined to discharge at the top of a Kern tower-storage system. A 3-ft. by 6-ft. Simplicity 2-deck vibrating screen is ordinarily used only to rerinse the material but can also be used for further sizing if desired. The conveyor and screen are driven by the same 35-hp. Continental gasoline engine. The tower has six storage compartments with a live capacity of 200 tons each. With the 1-cu.yd. Sauerman Crescent scraper the dead storage can be built to any amount desired. A storage of about 20,000 cu.yd. is usually accumulated to carry through the winter shut-down period. A ¾-cu.yd. P&H crawler crane serves as the movable head tower which operates this scraper.

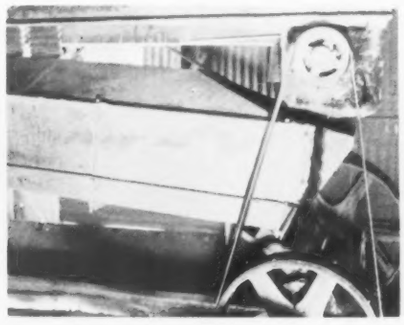


Sizing screen in the blast-sand plant.

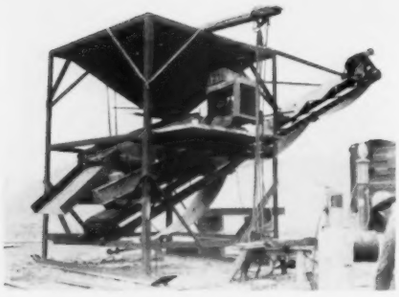
Material is reclaimed from storage



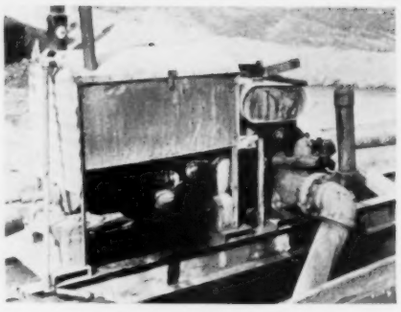
The special crushing and screening unit in the blast-sand plant.



Drive end of the screen in the blast-sand plant. Note complete inclosure.



Special screening unit for production of clay-bound road mix.



Wash-water pump designed with characteristics similar to drive motor.

The 50-hp. Diesel engine which drives all equipment in blast-sand plant.

through central discharge gates which are calibrated so that any required grading can be made. A 24-in. belt-conveyor operating on 130-ft. centers carries the material to a single-deck 3-ft. by 6-ft. Universal vibrating screen for a final rinse before it is discharged to the combination car- and truck-loading bins. These bins are of timber but it is planned to replace them with steel bins. The conveyor and screen are driven by a 35-hp. Continental gasoline engine. All shipments are weighed on a 25-ton Fairbanks truck scale. Water for washing purposes is supplied by an American Well Works, 1,200-gal. per min. centrifugal pump which has an 8-in. suction and is driven by a 45-hp. Continental gasoline engine. This pump was designed for this engine so that its static-pressure curve corresponds to the torque curve of the engine. Additional equipment includes fuel-oil and gasoline storage-tanks and a gasoline pump.

Material for the blast-sand plant is diverted at the scalping and crushing buildings. The sand bins are allowed to become filled and then the settling-box is set to allow the coarser material to flow to a pile outside the building. If desired, some pea gravel can also be added. The same Sauerman scraper system used at the storage tower moves this material to a stock-pile alongside the drying plant. The scraper is used for this purpose during the major part of the operating season, when the constant operation of the plant keeps the live-storage portion of each section of the tower filled.

A 60-ft. belt-bucket elevator takes the sand from the stock-pile to the top of the building, where it is discharged into a vertical stack-type drier. This is heated by a hand-fired Dutch oven type of furnace. The dried sand is taken by another 60-ft. belt-elevator back to the top of the plant, where it is discharged on an Orville Simpson No. 44 Rotex screen. This is 7 ft. long and 40 in. wide and has four decks. Three sizes of blast-sand are chuted to storage-bins. The oversize, usually plus No. 6, goes by a short belt-bucket elevator to a special 16-in. by 16-in. double New Holland roll crusher. In this machine an 18-in. by 36-in. vibrating screen removes the extreme fines from the product of the first pair of rolls and discharges the coarse material to the second pair of rolls. The fines are then combined for discharge to the dried-sand elevator which forms a closed circuit to the Rotex screen. Storage is provided by a 3-compartment electric-welded steel bin having a total capacity of 700 tons. All the equipment in the blast-sand plant is driven from a 50-hp. McCormick-Deering Diesel engine. A concrete sump in the building has a 6-in. pump for removing waste. Two Ellington & Curtis exhaust fans on the top of this building remove the dust created. One of 15,000-cu.ft. per min. capacity is connected to the drier and the other, an 8,000-cu.ft. per min. fan, is connected to the crusher and screen.

The office of the Andersen Sand & Gravel Co. is at 207 Eddy Bldg., Saginaw, Mich.

Shipping T. V. A. Cement

At the time of awarding the contracts for approximately 7,000,000 bbl. of cement the Tennessee Valley Authority endeavored to make an equitable distribution of the business among the various mills, after which the mills were requested to arrange among themselves to determine how much cement would be shipped from each mill at one time, according to P. J. Freeman, principal materials engineer of the T.V.A. A very satisfactory arrangement was worked out in connection with shipments of cement to the Norris and Wheeler Dams and recently similar arrangements have been made for shipments of cement for the Pickwick Landing Dam.

Shipments of cement to Norris Dam go forward entirely by railway to Coal Creek, Tenn., where the cement is unloaded from the cars by a pneumatic handling device and hauled in closed metal tanks by trucks to Norris Dam, approximately 4 mi. away, where it is again handled by air into overhead storage-tanks from which it is conveyed to the weighing batchers.

Cement for use in Wheeler Dam is shipped by railway from the mills to Sheffield, Ala., where it is transferred by air to barges and hauled up the river to the dam site. The cement is handled directly from the barges into the batchers serving the various mixers at Wheeler Dam.

Cement for use at Pickwick Landing Dam will be handled by an all-water method of transportation from one of the plants in Missouri directly to the dam site. Cement furnished by the other mills will go by railway to Sheffield and will be there transshipped by barge to the dam site. The procedure

(Continued on page 40)

Modern Gravel Dredge in South Carolina Equipped With Two Diesel Engines

One Drives Dredging Pump; the Other Runs Generator for Shore-Plant Power

THE Carolina Sand & Gravel Co. of Augusta, Ga., has a new plant operating at Kathwood, S. C. This plant is notable for its simple yet efficient design and for the modern hydraulic dredge which supplies the material to the plant. It has a capacity of about 100 cu yd. per hr. of gravel and an equal amount of sand.

The deposit is an old river bed overgrown with trees and underbrush located about 12 mi. southeast of Augusta, Ga , and about 1½ mi. north of the Savannah River, which separates the states of Georgia and South Carolina. The deposit is owned by the Holston Quarry Co., which formerly worked it for railway ballast, and is leased by the present operators. The deposit is estimated to contain about 2,500,000 tons of material. Part of the overburden, consisting of about 1 ft. of soil, trees, roots, etc., is removed by contract. As the remaining overburden, averaging 2 ft. in depth, is near water level and is friable material it is caved in with the sand and gravel and is removed in the washing of these materials. Dredging is at present being carried to a depth of about 30 ft. below water-level.

The dredge operates in an artificial pond created in the deposit. It is of the usual type and its superstructure and timber A-frame are mounted on a 20-ft. by 30-ft. cypress hull. The 30-ft. suction nozzle is operated by a single-drum hoist driven by a 10-hp. motor. A ball-and-socket joint connects the dredge intake line to the suction nozzle.

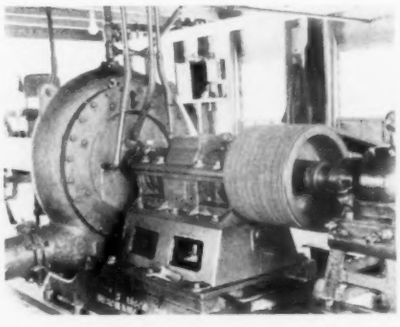
The dredge pump, an Amsco Type M machine has a 10-in. suction and 8-in. discharge and is driven through V-belts by a 130-hp., 6-cyl., Caterpillar Diesel engine. A 2-in. priming pump also supplies water for cooling the pump bearings and for keeping the pump glands clear. The 8-in. pipeline leading to the plant is about 350 ft. long and is supported on wooden pontoons. The discharge end of the line is 28 ft. higher than the pump level and the pump is averaging over 200 tons of solids per hr. under these conditions.

An interesting feature of the dredge is the fact that the power for all the electric motors used is generated on it, an arrangement made necessary because of occasional high water which floods the plant. A Caterpillar 65-hp., 3-cyl. Diesel engine drives a Columbia 250-v., 65-amp. generator which supplies current for the hoist and pump motors on the dredge and the screen and pump motors on shore, as well as for lights.

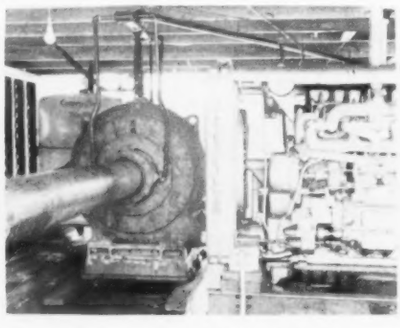
The dredge-line discharges at the plant on a stationary wire screen, having 2-in. openings, which removes roots, clay balls, etc. A second deck insures the removal of this material. A third deck below has ¼-in. cloth and removes the sand and water which flow into a wooden settling tank. By controlling the overflow of this tank various grades of sand may be obtained. When mason's sand is desired a ⅛-in. screen is inserted under the ¼-in. screen and the ⅛-in. to ¼-in. material is wasted.

Dredge of the Carolina Sand & Gravel Co. at Kathwood, S. C.

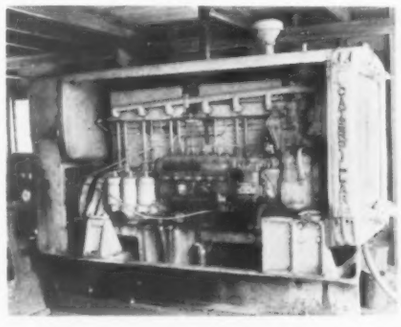
The material passing the 2-in. cloth and retained on the ¼-in. cloth is chuted to a double-screw washer of the company's own design. This differs from the ordinary washer of its type in that the screw flights are wavy, a feature that is said to improve the efficiency of the washer by increasing the agitation of the material. Clean water is introduced at several points in the



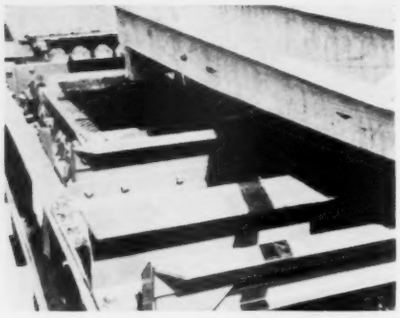
New type 8-in. dredge pump with V-belt drive.



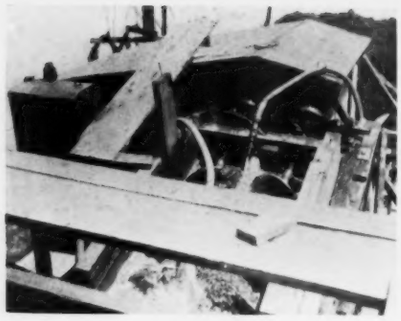
The pump and two Diesel engines on the dredge.



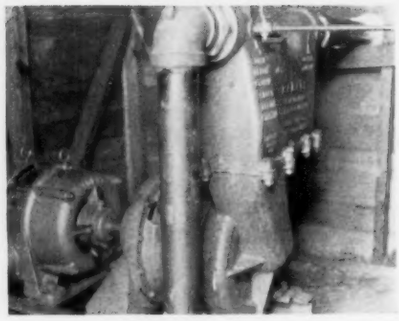
The 130-hp. Diesel engine which drives the dredge pump.



The 3-ft. by 17-ft. shaker screen which sizes all material.



The special double-screw washer with gasoline-engine drive.



The self-priming centrifugal pump which supplies wash water.

washer. The machine is driven by a 10-hp. LeRoi gasoline engine.

The washed gravel is discharged on a Pioneer 3-ft. by 17-ft. horizontal shaker screen equipped with two decks and fitted with sprays that give the material an additional washing. The screen is driven by a 10-hp. electric motor. Wire cloth with $^3/_4$- and 1-in. openings is used on the top deck and No. 4 and $^3/_8$-in. on the bottom deck. The sand from the tank and the three sizes of gravel from this screen are discharged into separate bin compartments having a live capacity of about 60 tons each. The bin is of latticed-timber construction and is filled with aggregates from the ground up. In the case of the sand particularly this arrangement allows the water to run off below the discharge level so that the sand discharged to cars is well drained.

Cars are loaded from the bins through side-discharge gates with drop chutes. A Porter steam locomotive hauls them a distance of about $1^1/_2$ mi. to the C. & W. C. Ry. About midway between the plant and the railroad a stock-piled reserve supply has been accumulated. All the handling of the material to and from the cars is done by an Erie steam crawler crane equipped with a $^3/_4$-cu.yd. clamshell bucket. Wash water for the plant is supplied by a Barnes self-priming centrifugal pump, which is driven by a 10-hp. Ideal electric motor and is housed on a float in a worked-out section of the dredge pond.

The plant of the Carolina Sand & Gravel Co. with dredge pond in foreground.

The offices of the Carolina Sand & Gravel Co. are at 434 Broad St., Augusta, Ga. F. I. Gibson is the company's general manager.

Shipping Cement *(from page 38)*

for handling the cement after arrival at the Pickwick Landing Dam has not yet been completed or the equipment installed.

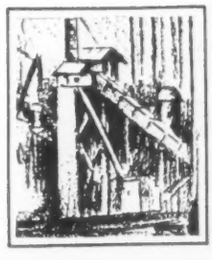
Daily requirements for cement in the construction of Norris Dam are approximately 3,500 bbl. and for Wheeler Dam the requirements are somewhat less than this amount. Cement shipped in bulk by freight is loaded under the supervision of a representative of the Authority and railroad weights are being accepted as representing the amount of cement in the car. It has been found necessary to make some adjustments from time to time in this connection because an investigation of the condition of the car occasionally showed that the net weight of the car changed, due to an accumulation of cement between the lining and the outside of the car. This sometimes hardens and remains in place. It is customary for railroads to charge for light-weighing cars so that the general practice is to use the weight stenciled on the car as the net weight. In handling a material as valuable as bulk Portland cement, it has been found that this practice is not always satisfactory for the payment of the cement, although the error introduced in the payment of freight may be negligible. It was found necessary to re-weigh the cars used by the various railroads and in some cases an adjustment was made by the mills for errors due to incorrect light weight of the cars. Such adjustments were made without a controversy on the part of the mills or the Authority, as both parties could understand the equity of the adjustment as made. Attention is called to this matter because purchasers of large quantities of cement which is shipped by bulk in freight cars should, at the outset, be certain that the correct weights for the empty cars are being used.

The experience of the Authority to date in testing about 1,300,000 bbl. of cement purchased under Type B specifications has been that the mills can readily meet such requirements, and the failure to do so occurs so seldom that no delays in delivery have been encountered at any time.

MEN OF THE INDUSTRY

FRANK N. ANDERSEN

FRANK N. ANDERSEN, owner of the Andersen Sand & Gravel Co., Saginaw, Mich., is an engineer with many years of practical experience. He has been responsible for much important construction work and in 1921-1929 had charge of all construction in eastern Michigan for the Consumers Co. of Jackson, amounting to as much as $15,000,000 annually. In 1929 he became a gravel producer. Mr. Andersen has been president of the Michigan Sand & Gravel Assn. and was president of the Saginaw Engineers' Club in 1927 and 1931. Under the N.R.A. he was chairman of District Committee No. 4 and a member of the regional and trade-practice-complaints committees of Region 10.



Personal Mention

A. P. Green, president of the A. P. Green Fire Brick Co., Mexico, Mo., was recently awarded the honorary degree of doctor of engineering by the Missouri School of Mines, Rolla, Mo.

R. A. Dunning has been appointed general sales manager of the Clyde Sales Co., Duluth, Minn., with which he has been connected in various capacities for the past sixteen years.

Geo. R. King, secretary of the Great Lakes Portland Cement Corp., Buffalo, N. Y., was elected a director of the Ceramic Assn. of New York at the recent meeting of that body.

R. M. Beaton, who has been a member of the sales force of the Atlas Lumnite Cement Co. for the past nine years, has been appointed metropolitan district sales manager of the Universal Atlas Cement Co. in New York City. **B. J. Whittaker,** formerly a field engineer for the Portland Cement Assn., has been appointed district sales manager at Albany, N. Y., in charge of the New York state territory. **C. L. Whalley,** who has been with Universal Atlas for the past 16 years, has been appointed asst. district sales manager at Newark, N. J., where he will have charge of the northern New Jersey territory under the direction of Mr. Beaton.

C. L. Mikesh, president of the Ottumwa Sand Co. of Ottumwa, Ia., and former president of the Ottumwa Chamber of Commerce, has been named one of the directors of the Greater Iowa Council, a subsidiary of the Greater Iowa commission.

John L. Senior, president of the Cowham Engineering Co., has been reëlected president and general manager of the Florida Portland Cement Co. of Hookers Point, Fla.

W. S. Long, formerly manager mechanical sales of the United States Rubber Products, Inc., in the Seattle district, has been transferred to the Los Angeles district acting in the same capacity. **C. W. Gilmer,** formerly salesman in the Los Angeles district has been appointed manager mechanical sales in the Seattle district.

Eric J. Ochs, superintendent for the past ten years at the plant of the Standard Portland Cement Co. of Painesville, O., has resigned to become superintendent at the plant of the Green Bag Cement Co. of Pennsylvania at Neville Island, Pa. **Harry Stevens,** asst. superintendent at the former plant, will take over the duties of Mr. Ochs as acting superintendent.

Prof. S. S. Steinberg, head of the Department of Civil Engineering at the University of Maryland, has been appointed to serve as president of the newly organized Educational Division of the American Road Builders' Assn.

Donald F. Potter has joined the sales organization of the New York Belting & Packing Co. and will take over the territory made up of Delaware, Maryland, Virginia, North Carolina and southern Pennsylvania.

L. R. Veatch has been appointed by Stephens-Adamson Co., of Aurora, Ill., to handle sales and engineering of their Redler conveyors in Buffalo, N. Y., and surrounding territory.

J. E. Burke, formerly head of the ready-mixed concrete division of J. K. Davison & Bro., Pittsburgh, Pa., is now president of the State Construction Co., New Kensington, Pa., which is also in the ready-mixed concrete business.

H. St. G. T. Carmichael, vice-president in charge of production for the Kentucky Rock Asphalt Co., Kyrock, Ky., on June 7 was awarded the Thomas Nelson Page medal for 1935 by Washington & Lee University at Lexington, Va. At that time he was also elected president of the alumni association. Mr. Carmichael has been chairman of the Kentucky State Planning Board since its formation a year ago and is also on the planning board of the T.W.A.

William L. Batt, president of SKF Industries, Inc., Philadelphia, has been nominated for the office of president of the American Society of Mechanical Engineers.

F. M. Thorman, quality supervisor of the U. S. Gypsum Co., Oakfield, N. Y., addressed the recent meeting of the Ceramic Assn. of New York on the subject of "Quality Control."

Edward J. Burnell, general sales manager of Link-Belt Co., Chicago, has sailed for Europe, where he will study coal handling, washing and separation methods used in England, Germany and Belgium.

Obituary

Herbert L. Cary, 57, asst. auditor of the American Wire and Steel Co., died July 17 in Chicago. He was connected with the company and its predecessor since 1893, and served as asst. auditor for the past 16 years.

William H. Powell, 68, electrical engineer, who has been connected with the Allis-Chalmers Mfg. Co., Milwaukee, for the past 27 years, died July 8.

Albert Clark Lehman, 56, chairman of the board of the Blaw-Knox Co., and founder of its original unit, died at his home in Pittsburgh, July 24. Mr. Lehman served the company first as vice-president and later as president continuing in that position until recently when he was elected chairman of the board.

George J. Stubblefield, 68, vice-president of the Estill Springs Sand and Gravel Co., died July 10, at his home in Nashville, Tenn.

George Otis Rockwood, 62, president of the Rockwood Mfg. Co., and the General Fiber Products, Inc., both located in Indianapolis, Ind., died July 2, in the St. Vincent Hospital in Indianapolis.

George M. Henry, 42, New England manager for the Lehigh Portland Cement Co., died July 5 in the Carney Hospital in Boston, Mass., following an operation for appendicitis.

Coming Events

August 19-24, 1935, San Francisco, Cal.—Annual convention, American Chemical Society.

October 14-18, 1935, Louisville, Ky.—24th Annual Safety Congress, National Safety Council, Inc.

December 2-7, 1935, New York, N. Y.—Exposition of Chemical Industries.

December 9-12, 1935, Miami, Fla.—Annual convention, American Assn. of State Highway Officials.

NEW CORPORATIONS

THE CAROLINA SAND & GRAVEL CO., Kathwood, S. C. Capital stock of $25,000. Incorporators, C. G. Fuller and Calhoun Lemon.

THE SMELTER SAND & GRAVEL CO., El Paso, Tex. Incorporators, Hugh McMillen and John Wood.

THE ARIZONA ASBESTOS CORP., Los Angeles, Cal. Incorporators, George D. Tenny, Globe, Ariz.; Louis H. Mesenkop, Los Angeles, Cal.; Charles R. Lingle, Pasadena, Cal.

THE KNOXVILLE LIME MANUFACTURING CO., Knoxville, Tenn. Capital $25,000. Incorporators, E. L. Osborne, 22 Marulla St. Bldg., Atlanta, Ga.; W. W. Cowan, 703 20th St., Knoxville, Tenn. New company has lime plant located in Asbury, Tenn.

THE SILICA PRODUCTS CO., St. Louis, Mo. Capital $200,000. Incorporators, Robert E. Moloney, George T. Priest, 705 Olive St., and others.

THE NORTH CAROLINA FELDSPAR CORP., Erwin, Tenn. Capital $100,000. Incorporators, W. F. Denee and L. L. McIntyre, Jr.

THE TEXAS SAND & GRAVEL CO., San Antonio, Tex. Capital $10,000. Incorporators, T. D. Porr, James Donaldson, 302 Dunning; and others.

THE FELDSPAR PRODUCTS CO., Penland, N. C. Capital stock $100,000. Incorporators, W. F. Deneen, Johnson City, Tenn.; W. B. Dean, Bakersville, N. C.; and others.

LYMAN-RICHEY SAND & GRAVEL CORP., Wilmington, Dela. Capital $220,422.50. To develop the different varieties of sand and silex.

NATIONAL ROCK WOOL SALES, INC., Lagro, Ind. Capital stock 1,000 shares n.p.v. Incorporators, Walter S. Gibson, C. V. McKinney, and Floyd Gibson. To manufacture and sell rock and mineral wool and products thereof.

THE GENERAL SALT CO., Louisville, Ky. Capital stock $20,000. Incorporators, Lawrence Jones, Sr., J. Lyle Bayless, and others.

WESTERN ROCK WOOL CORP., Huntington, Ind. Capital 500 shares $100 par value stock. Incorporators, Bert B. Williams, James E. Lesh, and U. S. Lesh. To mine and refine rock, rock wool and other minerals.

THE CHILLICOTHE GRAVEL CO., Chillicothe, Ill. Capital 500 shares no par value. Incorporators, Thomas Gibbons, Mr. and Mrs. John Gibbons, and Jacob Irions. To manufacture, refine and sell silex, sand, gravel and other products.

Aggregates Statistics *

THE increase in construction in 1934 was reflected in an advance of about 14 per cent. in the output of commercial sand-and-gravel plants. Activity in local road-building projects, however, apparently slumped during the year, for preliminary returns show a decline in the production of sand and gravel reported by states, counties, municipalities, and other government agencies. Available data on the consuming markets and partial returns from producers indicate that the total output of sand and gravel in 1934 amounted to about 113,000,000 short tons valued at approximately $65,000,000.

Sand and gravel sold for virtually all uses showed increases in 1934 compared with 1933. Molding sand, and fire and furnace sand reflected activity in the steel industry with advances of 30 and 41 per cent., respectively. Increased output of building and paving sand and gravel accounted for most of the advance in the total commercial production. Values also were higher in 1934 than in 1933. Salient statistics of the sand-and-gravel industry in 1933 and preliminary figures for 1934 are summarized in Table I.

Noncommercial Production.—Since 1932 statistics of the sand-and-gravel industry have been broken down to show production by commercial operations and by noncommercial operations—states, counties, municipalities, and other government agencies. Noncommercial producers in 1933 reported a total of 41,648,877 short tons of sand and gravel with an average value of 33 c. a ton.

Only 13,645,409 short tons—about one-third—of the sand and gravel produced by noncommercial operations in 1933 was washed or screened to make it comparable in quality with the output of the average commercial plant. By far the larger part consisted of pit-run material having a low unit value.

Complete statistics from noncommercial producers are not yet available but partial returns for 1934 indicate a drop of about 10 per cent. in noncommercial output compared with 1933. An advance of about 21 per cent. in average value per ton is also indicated.

Prices. — Complete data on the average value of the sand and gravel produced in 1934 are not yet available, but preliminary figures based on partial returns from producers indicate a general increase over 1933. The average value of all sand accounted for increased 13 per cent. from 61 c. a ton in 1933 to 69 c. in 1934; the average gravel value increased 8 per cent., from 59 c. to 64 c. Wholesale-price statistics compiled by the Bureau of Labor Statistics show an advance of 13 per cent. in the price of building sand in 1934 compared with 1933, and 7 per cent. in the price of building gravel.

Apparently the average value of noncommercial production also increased, from 33 c. in 1933 to about 40 c. in 1934.

Railway and Waterway Shipments.—Shipments of sand and gravel on Class I railroads in 1934 amounted to 27,683,407 short tons, an advance of 27 per cent. from 21,818,258 tons in 1933. This increase terminated an uninterrupted sharp decline since 1928. As preliminary figures of commercial production indicate an increase in output of only 14 per cent., apparently the trend toward increased use of truck transportation also was arrested. In 1932 and 1933 only 38 per cent. of commercial production, exclusive of glass and molding sand and non-revenue railroad ballast, was shipped by railway, but in 1934 preliminary figures indicate that 42 per cent. was carried on Class I roads.

The upturn in railway shipments was fairly uniform over the entire country. The notable exception was the Southwestern Region, wherein shipments in 1934 dropped 1 per cent. from 1933. Elsewhere increases ranged from 16 per cent. in New England to 85 per cent. in the Northwestern Region.

The quantity of sand and gravel shipped by barge on the Ohio and Monongahela Rivers in the Pittsburgh district increased 3 per cent., from 1,540,480 short tons in 1933 to 1,581,410 short tons in 1934.

Markets.—More than half of the output of sand and gravel from commercial operations is used in concrete construction, either highways or buildings. Portland-cement consumption therefore provides a good indicator of the demand for sand and gravel. Cement shipments in 1934 increased 18 per cent. from 1933, which checks closely the advance of 14 per cent. indicated by preliminary figures of commercial sand-and-gravel production. Shipments of paving asphalt, which also indicate the demand for sand and gravel, increased 16 per cent. in 1934 compared with 1933.

Most of the output of noncommercial operations is unprepared pit-run material used locally in road construction. Preliminary returns indicate a drop of about 10 per cent. in the production of this type of material in 1934 but sales of road oil, which com-

Table I.—SAND AND GRAVEL SOLD OR USED BY PRODUCERS IN THE UNITED STATES, 1933-34, BY COMMERCIAL AND NONCOMMERCIAL OPERATIONS, AND BY USES.

	1933		1934[1]		Percent of Change	
	Amount (*short tons*)	Value per Ton	Amount (*short tons*)	Value per Ton	Tonnage	Value per Ton
COMMERCIAL OPERATIONS						
Sand:						
Glass	1,781,423	$1.69	1,920,000	$1.75	+8	+4
Molding	1,718,251	.91	2,240,000	.95	+30	+4
Building	13,024,174	.50	16,400,000	.56	+26	+12
Paving	10,903,447	.51	11,500,000	.57	+5	+12
Grinding and polishing	572,735	1.29	580,000	1.75	+1	+36
Fire or furnace	106,133	1.14	150,000	1.55	+41	+36
Engine	1,051,695	.59	1,250,000	.75	+19	+27
Filter	24,387	2.14	35,000	2.00	+44	−7
Railroad ballast [2]	721,381	.27	650,000	.31	−10	+15
Other	1,121,271	.45	775,000	.80	−31	+78
Total sand	31,024,897	.61	35,500,000	.69	+14	+13
Gravel:						
Building	11,934,080	.68	14,500,000	.67	+22	−1
Paving	17,719,859	.59	19,500,000	.68	+10	+15
Railroad ballast [3]	4,928,031	.36	5,500,000	.41	+12	+14
Other [4]	499,605	.58	500,000	.50		−14
Total gravel	35,081,575	.59	40,000,000	.64	+14	+8
Total sand and gravel	66,106,472	.60	75,500,000	.66	+14	+10
NONCOMMERCIAL OPERATIONS [5]						
Total sand and gravel	41,648,877	.33	37,500,000	.40	−10	+21
COMMERCIAL AND NONCOMMERCIAL OPERATIONS						
Grand total	107,755,349	.49	113,000,000	.57	+5	+16

[1] Figures subject to revision.

[2] Includes some sand used for fills and similar purposes. The quantity of sand reported as used exclusively for ballast in 1933 was 550,948 short tons valued at $160,576. The figures include sand produced by railroads for their own use in 1933 as follows: Ballast, 50,811 short tons valued at $7,694; fills and similar purposes, 170,433 short tons valued at $32,577.

[3] Includes some gravel used for fills and similar purposes. The quantity of gravel reported as used exclusively for ballast in 1933 was 4,668,597 short tons valued at $1,747,452. The figures include gravel produced by railroads for their own use in 1933 as follows: Ballast, 1,232,795 short tons valued at $247,522; fills and similar purposes, 259,434 short tons valued at $29,711.

[4] May include some gravel used by railroads for fills and miscellaneous purposes.

[5] By states, counties, municipalities, and other government agencies, directly or under lease.

* By H. H. Hughes and M. Allan, U. S. Bureau of Mines.

Table II—SUMMARY OF DATA RELATING TO PRODUCTION AND CONSUMPTION OF SAND AND GRAVEL[1]

		1933	1934 [2]	Percent of Change in 1934
Sand-and-gravel shipments:				
Railway shipments, Class I roads [3]	*short tons*	21,818,258	27,683,407	+27
Waterway shipments: Pittsburgh district [4]	*short tons*	1,540,480	1,581,410	+3
Correlative industries:				
Portland-cement shipments	*bbl.*	64,282,756	75,917,000	+18
Paving-asphalt shipments	*short tons*	798,607	924,135	+16
Cut-back asphalt shipments	*short tons*	508,553	624,183	+23
Road-oil sales	*bbls.*	6,238,898	7,702,753	+23
Construction: [5]				
Concrete-pavement contract awards [6]	*sq. yd.*	45,128,000	45,108,000	
Construction contract awards [7]		$1,256,601,000	$1,543,842,000	+23
Railway expenditures, Class I roads: For ballast [8]		$7,814,383	$8,855,000	+13
Glass production, monthly average:				
Glass containers [9]	*gross*	1,960,000	2,983,000	+52
Illuminating glassware [10]	*turns*	1,387	1,517	+9
Polished plate glass [11]	*sq. ft.*	7,493,000	7,651,000	+2
Foundry activity:				
Foundry and malleable pig-iron production	*gross tons*	1,521,945	2,154,349	+42
Malleable castings [12]	*short tons*	268,638	369,458	+38
Freight-car loadings, all commodities:				
Total monthly average [13]	*cars*	2,415,000	2,566,000	+6

[1] Many of the data available in this table are published currently in *Survey of Current Business;* comparable data for 1928 are given in Minerals Yearbook, 1934, page 839. [2] Figures for 1934 are subject to revision. [3] Interstate Commerce Commission. [4] Chief Statistician, Board of Engineers for Rivers and Harbors. [5] Detailed statistics of construction are contained in the cement chapter in this volume. [6] Portland Cement Assn. [7] F. W. Dodge Corp. [8] Interstate Commerce Commission and Bureau of Railway Economics. [9] Glass Container Assn. [10] Illuminating Glassware Guild. [11] Plate Glass Manufacturers of America. [12] U. S. Bureau of the Census. [13] American Railway Assn.

monly is used also in low-type roads, increased 23 per cent. in 1934 compared with 1933.

Data relating to the production and consumption of sand and gravel are summarized in Table II.

Highway Construction.—Concrete-highway construction was maintained during 1934 at about the same low level as in 1933. According to statistics of the Portland Cement Assn., the total concrete - pavement contract awards were only 45,108,000 sq. yd., virtually no change from 1933 but a drop of 70 per cent. from the 1928 "peak."

General trends in the construction of bituminous roads are shown by the statistics of asphalt shipments and road-oil sales. Shipments of paving asphalt increased from 798,607 short tons in 1933 to 924,135 short tons in 1934, an advance of 16 per cent. Shipments of cut-back asphalts, commonly used for mixed-in-place bituminous surfaces, increased 23 per cent. from 508,533 short tons in 1933 to 624,183 short tons in 1934. Road-oil sales also picked up in 1934, increasing 23 per cent. from 6,238,898 bbl. in 1933 to 7,702,753 bbl. in 1934.

These data tend to confirm partial returns from sand-and-gravel producers indicating that the production of paving sand by commercial operations amounted to about 11,500,000 short tons in 1934, an increase of 5 per cent. from 10,903,447 short tons in 1933. Paving-gravel production apparently increased about 10 per cent., from 17,719,859 short tons in 1933 to about 19,500,000 short tons in 1934.

Nearly all the sand and gravel reported by noncommercial producers also is used for paving, and this material should be included in the total figures for aggregates consumed in highway and road construction. Preliminary returns indicated that the quantity of sand and gravel produced by noncommercial operations in 1934 may have declined about 10 per cent. compared with 1933.

Building Construction.— The total construction contracts awarded in 37 states east of the Rocky Mountains during 1934 were valued at $1,543,842,000 according to statistics of the F. W. Dodge Corp. Although this total represents an advance of 23 per cent. compared with 1933, it is still 77 per cent. below the 1928 "peak." Supplementary records of construction activity also show moderate advances in 1934. The value of building permits issued in 819 cities throughout the United States increased 6 per cent. from 1933; engineering-construction contract awards advanced 27 per cent.

Returns from approximately half the commercial sand-and-gravel producers substantiate the indicators of the demand for building sand and gravel. The production of building sand in 1934 was about 16,400,000 short tons, an increase of 26 per cent. from 13,024,174 short tons in 1933. The output of building gravel increased about 22 per cent., from 11,934,080 short tons in 1933 to 14,500,000 short tons in 1934.

Railroad Ballast.—The demand for railroad ballast declined sharply as a result of railroad economies during the depression, but in 1934 there was a moderate upturn in expenditures for ballast. Estimates of the Bureau of Railway Economics indicate that total ballast expenditures by Class I roads in 1934 amounted to about $8,855,000, an increase of 13 per cent. from $7,814,385 in 1933. Although expenditures include all kinds of material used as ballast as well as transportation and unloading costs, about 60 per cent. of the reported expenditures represents the actual cost of the material.

Preliminary returns from producers also show an increase in ballast production and all available data indicate an output of ballast gravel in 1934 amounting to 5,500,000 short tons, an advance of 12 per cent. from 1933. Railroad ballast sand may have dropped about 10 per cent. in 1934 compared with 1933.

Other Outlets.—The production of glass sand in 1934 was about 1,920,000 short tons, 8 per cent. higher than in 1933, according to returns from companies which accounted for nearly 90 per cent. of the total output in 1933. This advance seems moderate, for the production of glass containers in 1934 increased 52 per cent. compared with 1933. The output of plate glass, however, the other large outlet for glass sand, barely surpassed the 1933 production. Illuminating-glassware production in 1934 advanced 9 per cent. from 1933.

Activity in the steel and foundry industries was reflected in an increase of 30 per cent. in the output of molding sand in 1934 compared with 1933, and 41 per cent. in the output of fire or furnace sand.

The demand for grinding and polishing sand depends directly upon conditions in the dimension-stone and plate-glass industries, and preliminary returns indicate an increase in output of 1 per cent. in 1934 compared with 1933.

Freight - car loadings, which advanced 6 per cent. in 1934, may bear some relation to demand for engine sand, and reports of producers indicate an output in 1934 about 19 per cent. higher than in 1933.

Partial returns from producers show an apparent increase of 44 per cent. in 1934 in the output of filter sand and a drop of 31 per cent. in production of sands used for miscellaneous or unspecified purposes.

Du Pont Will Exhibit at Eastern States Exposition

Depicting the progress of chemical industry and dramatizing the part it plays in every day life, 21 manufacturing divisions of the E. I. du Pont de Nemours & Co., Inc., will show their products and indicate the processes by which they are produced at the Eastern States Exposition in Springfield, Mass., from Sept. 15 to 21, inclusive.

The exhibit, "The March of Chemistry," will occupy 356 running feet in the Exposition's three-acre Industrial Arts Building and, it is said, will be the largest single display ever presented at an annual exhibition. It will be of educational nature and will cover a wide range of chemical products, including several spectacular new developments of du Pont research laboratories, showing how they are made, how they are used and how they serve, often in an unseen way, the ultimate consumer. The exhibit will be under the direction of William R. Hart and R. A. Applegate, director and assistant director of du Pont advertising.

Link-Belt Co. Appoints New Distributor in New England

The Link-Belt Co., Shovel and Crane Division, Chicago, announces the appointment of the Construction Equipment Co., 2274 Main St., Hartford, Conn., as authorized distributors of Link-Belt crawler-mounted shovels, cranes, draglines, and track-type locomotive cranes. George L. Kaeser is president of the Construction Equipment Co.

Foreign Developments

How High Temperatures Affect Alumina Cement

It has been known for a long time that aluminous cements can undergo drastic variations when setting and initial hardening take places at temperatures higher than usual. Various former investigations and published reports showed that higher temperatures had an injurious effect on such cements, but no particular study has been made of the scientific explanation of the phenomena.

The studies here reported were carried out by means of the well-known method of Le Chatelier on the hydration process at different temperatures. The cement to be the subject of each experiment, gaged with the determined quantity of water, was placed in a glass flask in such a way that the flask was entirely filled with the paste. The flask was then tightly closed with a stopper through which was inserted a graduated glass tube filled to a determined height with water, and the whole placed in a thermostat. It is then only necessary to record from time to time the height of the water in the graduated tube in order to follow the course of the hydration.

Experiments were made both with a cement almost pure monocalcium aluminate, with a very slow set (7 hr.) and an alumina cement from the market, with a normal set (2 hr.), and the results of the observations charted in various ways. In the case of each kind of cement it was observed that within a comparatively narrow range of temperatures there was no noteworthy adsorption of water, while both in the lower and the higher temperature ranges great similarity was observed in the hydration. In the case of the commercial alumina cement the critical temperature of non-hydration was 31 deg. C.; no initial set was determined even after 9 hr.

The idea that the aluminate anyhydrides in this range had an altered solubility was shown to be erroneous. On the contrary it could be determined that the solubility increases progressively with the temperature with no anomaly. However, it could be observed that after several days the quantities of water taken up were considerably different from those at higher temperatures. There exist numerous calcium-aluminate hydrates, all which can be formed from supersaturated solutions of monocalcium aluminate. The hydrates that form at lower temperatures are not the same as those which form at higher temperatures, and in the range about 30 deg. C. there is a zone in which the conditions are not favorable for the formation of either kind.

The decrease in strength through the action of temperatures over 25 deg. C. can now be explained in that here occurs a range in which the aluminate of Thorvaldson, $Al_2O_3 3CaO 6H_2O$, predominates. This aluminate crystallizes in cubes and trapezohedra and does not provide any internal connection like that of the aluminate hydrates in needles, spheroliths and tables.

It further appears that the iron content in certain cases is a factor in the instability of alumina cements, but that it plays no particular part in connection with the variation in the properties of alumina cement under high temperatures. No essential difference in this respect between the commercial cement and the monocalcium-aluminate cement, widely differing in composition, was observed—*Tonindustrie - Zeitung* 59:417 - 418 (April 25, 1935), from a paper by L. Seailles at the 14th Congress of Industrial Chemistry, Paris, October 21-27, 1934.

Reports New Studies On Setting of Cement

New studies made by the author on the hydration of cement, by means of observations of the electrical conductivity of the solutions and by X-ray study lead to the following principal conclusions:

(1) In the presence of water the lime coagulates the silica, which is why silica is not found in the filtered solution after shaking the cement with water.

(2) The precipitate of silica fixes a certain quantity of lime from the solution, at first rapidly, then slowly. Transformation into calcium silicate is sufficient even after a short time after the beginning of the reaction to be visible on examination by X-rays.

(3) Study of the reaction by chemical analysis and examination by X-rays showed the existence of only one hydrated silicate of lime, the monocalcium silicate already indicated by Messrs. Le Chatelier and Lafuma by a different method. The other hydrated calcium silicates indicated by various authors are not definite compounds, but mixtures of monocalcium silicate, lime and sometimes coagulated silica.

(4) Hydrated monocalcium silicate gives by hydrolysis a solution containing 0.060 gr. of CaO per liter, sufficiently concentrated to coagulate more silica than it contains of lime.

(5) In the presence of an excess of lime, such as occurs in the setting of Portland cement, the solid continues for months to fix lime by absorption.

(6) The formation of hydrated calcium silicate is not due exactly to the same phenomena as the setting of plaster. Plaster yields a supersaturated solution which allows the deposit of a stable compound, gypsum. On the other hand, the composition of the product of the reaction of silica on lime evolves. The silica gel transforms little by little into hydrated calcium silicate.

(7) The systematic oppositions between the colloidal and crystalline theories concerning the setting of siliceous binding materials do not appear justified. In the course of the reaction there forms along with the silica gel a definite micro-crystalline product, hydrated calcium silicate. Even several hours after the beginning of the reaction this product exists in quantities sufficient to be visible by X rays, if only sufficient necessary precautions are taken to carry out this examination with sufficient sensitivity. —L. Chassevent in *Revue des Materiaux de Construction*, No. 308, May, 1935, pp. 127-128.

Sedimentation Apparatus for Control of Fineness

In view of the now generally recognized importance of the granular composition of cement in connection with its strength properties, and also the necessity of controlling the grinding process both for maximum quality of the cement and for economy of grinding costs, it is necessary to determine the granular composition, especially of the fraction that can not be determined by means of sieves, with as much exactness as possible. The Gonell air separator and the Wagner sedimentation apparatus operate with great exactness and sharpness of separation; unfortunately, however, their comparative complexity and the time required for making the determination rather exceed the requirements for practical control of plant operations. The Kühl-Czernin sedimentation apparatus seems to be suitable for current laboratory tests in plant operation, as within half an hour it determines with fair exactitude the fraction below 30 microns. The air separator of the type of the flourmeter used in many countries gives results corresponding to those with the 10,000-mesh sieve, while the Kühl-Czernin sedimentation apparatus not only shows the fraction of fine meal better than the 16,900-mesh sieve, but also determines the proportions of two coarser fractions at the same time. A distinction must be drawn between scientific methods of investigation and practical laboratory testing, the former demanding extreme exactness and the latter sufficient exactitude and convenience for control of plant operations.—Vieri Sevieri, in *Tonindustrie-Zeitung* 59: 401-403, 426-427, April 18 and 29, 1935.

Traffic News and Comment

Legislation

An unusual action was taken by the Senate judiciary committee on July 15, when it ordered an unfavorable report on the Wagner bill, S. 2,944, which was designed to limit practice before the Interstate Commerce Commission and other governmental agencies to attorneys at law. Usually any bill which does not receive the approval of a majority of the committee is allowed to die in committee, but in this case there was so much opposition to this proposed legislation that definite action was taken. If the bill is taken up in the Senate it will probably be defeated on account of the adverse committee report. In the nonmetallic-minerals industry transportation is one of the very important elements in the marketing of the finished product and practically every branch of the industry has had its rate structure, or a part of it, reviewed by the commission. Many of these producers employ traffic managers who are thoroughly familiar with the rate structure, with interstate commerce law and who have had years of experience in practicing before the federal and state commerce commissions. There are comparatively few attorneys who are familiar with procedure before the commission or with rate structures and other matters that enter into cases coming before the commission. The defeat of this bill will save the industry a great deal of expense that would be incurred were it necessary to employ attorneys to handle cases. It is worthy of note that many attorneys who specialized in practice before the commission were opposed to this bill.

The House committee on interstate and foreign commerce on July 10, received the report of the subcommittee which has been holding hearings on bills to modify or repeal the fourth section of the Interstate Commerce Act. The subcommittee favors the repeal of the fourth section with an amendment placing the burden of proof on the carriers with respect to certain rates. Proponents of this bill expect to see it passed by the House this session, although the press of administration "must" legislation may prevent its consideration at this session. There does not appear to be much possibility of its being acted upon by the Senate before the next session.

In the Senate subcommittee holding hearings on railroad pension bills it developed that the employees were not agreed on this legislation, there being two organizations purporting to represent employees. Murray Latimer, in testifying before the House subcommittee of the interstate commerce committee which began hearings on identical pension bills, estimated that the pensions would cost $59,000,000 in 1936 and $259,000,000 in 1965. Mr. Murray was chairman of the Railroad Retirement Board, created by the pension act that was declared unconstitutional by the Supreme Court. As the President is opposed to having this legislation passed at this session of Congress it is not likely that it will be considered on the floor of either the House or the Senate at this session.

Several bills sponsored by railroad labor, intended to establish the 6-hr. day, limit the length of trains, provide for the inspection of tracks, bridges and signals, regulate train dispatching, and provide for full crews, will probably not be acted upon at this session. These bills are opposed by the National Industrial Traffic League and other organizations. The carriers contend that they are not needed in the interest of safety or in the interest of the employees.

Recent I.C.C. Decisions

Cement.—After further consideration the commission has reversed its former decision in 203 I. C. C. 443, and now finds that the proposed rates on cement from El Paso, Tex., to destinations on the lines of the Southern Pacific in New Mexico have been justified, and that they were not unreasonable, and has discontinued the proceeding in I. & S. Docket No. 3,973, Cement from El Paso, Tex., to New Mexico.

Crushed Stone.—In a third supplemental report, issued after further hearing, the commission has modified the findings in 195 I. C. C. 89, to permit the establishment of a rate of 30c per ton, car-load minimum weight 55 tons, on crushed stone from the quarries of the Consumers Co., Dolese & Shepard and the Riverside Lime & Cement Co., near McCook, Ill., to the sewage-treatment plant of the Sanitary District of Chicago at 39th St. and 52d Av. in the Chicago switching district. Permission to establish this rate expires Dec. 31, 1937.—I. C. C. Docket No. 19,610, Switching Rates in Chicago Switching District.

Dolomite.—Finding the rates applied on dolomitic limestone from Ashley Falls, Mass., to East Weymouth, Mass., prior to Dec. 20, 1934, and on ground magnesium limestone from Canaan, Conn., to East Weymouth in 1933, not unreasonable, and finding further that complainant has not been shown to have been damaged by any unreasonable prejudice or preference, the commission has dismissed the complaint in I. C. C. Docket No. 26,477, American Agricultural Chemical Co. *v.* N. Y. N. H. & H.

Sand.—The commission has awarded reparation on finding the rates on silica sand from Lancaster, Pa., to South Vineland and Manumuskin, N. J., were unreasonable to the extent they exceeded $1.60 per ton. Rates on molding sand from New Hamburg, South Schenectady and Stuyvesant, N. Y., to Lancaster, Pa., were found to be not unreasonable.—I. C. C. Docket No. 26,587, Burnam Boiler Corp. *v.* Pennsylvania *et al.*

On petition of the Seaboard Air Line the commission has issued a second supplemental report, modifying its findings in 177 I. C. C. 123 and 197 I. C. C. 215, to permit the establishment of a rate of 36c. a net ton on sand from Dixiana to Columbia, S. C., when for delivery on the respondent's tracks at Columbia, and the same rate plus switching charges when for delivery in Columbia on the tracks of other carriers.—I. C. C. Docket No. 22,109, Rates on Sand, Gravel, Crushed Stone, etc. Within the State of South Carolina.

Examiner's Report

Sand.—Examiner T. Leo Haden proposes that the commission award reparation amounting to $22,696.54 on account of unreasonable rates on lake or beach sand, from Muskegon, Mich., to Westfield, Mass., on shipments moving over routes No. 1 to 13 as reported in prior findings in 188 I. C. C. 99, and $190.98 on shipments that moved over route No. 14. The carriers in this case have challenged the jurisdiction of the commission inasmuch as the routes over which the shipments moved were through Canada. The examiner would not rule on this contention but said that the question would be disposed of later. The proposed reparation was figured by using Scale III, prescribed in Industrial Sand Cases, 188 I. C. C. 99, extended to 1,400 mi. to cover the hauls in this case.—I. C. C. Docket No. 22,476, H. B. Smith Co. *v.* N. Y. N. H. & H.

New Complaints Filed

Crushed Stone.—A complaint attacking the rates on crushed stone from Sloan, Nev., to Dyer, Cal., as being in violation of Sec. 1, and asking for new rates and reparation, has been filed in I. C. C. Docket No. 27,046, Holly Sugar Corp., Colorado Springs, Colo. *v.* A. T. & S. F.

Ground Limestone.—An allegation of unreasonable rates and charges on ground limestone from Thomasville, Pa., to Millville, N. J., has been made in a complaint filed in I. C. C. Docket No. 27,042, Whitall Tatum Co., Philadelphia, Pa. *v.* Western Maryland.

Sand.—The commission has suspended schedules in Supplement No. 15 to Illinois Central I. C. C. No. A-10,814, Southern I. C. C. No. c-2,189 and Supplement No. 9 to Jones' I. C. C. No. 2,763, proposing to cancel proportional rates, or factors used in constructing combination rates, on molding sand in car-loads, from Ohio River crossings, when originating in the South, and from Evansville and other southern Indiana points on the Evansville & Ohio Valley to destinations in Central Freight Assn. and Illinois territories, and to Mississippi River crossings when destined beyond, in I. & S. Docket No. 4,112.

New rates and reparation are sought on an allegation of unreasonable rates in two complaints. In the first, I. C. C. Docket No. 26,978, Sub. No. 2, Manufacturers' Foundry Co., Waterbury, Conn. *v.* N. Y. N. H. & H., the rates on molding sand and foundry sand from points in New Jersey and New York to Waterbury, Conn., are under attack. In the other, same docket, Sub. No. 3, the rates on molding sand, core sand and foundry sand from points in New York, New Jersey and Massachusetts to Waterbury, Conn., are complained of.

Questions and Answers

Q.—Does the Interstate Commerce Commission have jurisdiction over rates between points in the United States when the route is partly through Canada, and can the commission prescribe rates over such routes?

A.—While the commission has jurisdiction over rates between points in the United States when the route is partly through a foreign country, it has refused to prescribe rates over such routes. Some of the rulings of the commission in cases involving this issue follow. "The act applies to traffic passing out of the United States while in transit." 8 I. C. C. 214.—"Joint rates for traffic between points in the United States over intermediate Canadian rails are obviously not under the control of the Canadian commission, and necessarily fall within the commission's jurisdiction." 33 I. C. C. 567.—"The commission has jurisdiction with respect to rates on a shipment between points in the United States which moves in part through Canada." 80 I. C. C. 512.—"The commission is without jurisdiction to prescribe a rate for the future from a point in the United States through a foreign country to a point in the United States." This ruling is found in three decisions, 69 I. C. C. 337, 102 I. C. C. 27 and in 129 I. C. C. 427. Further, in 147 I. C. C. 647, the commission said, "The commission should not prescribe joint rates over any routes based on distances over routes through a foreign country, in connection with which it is without authority to prescribe joint rates, regardless of the fact that some carriers have for many years and do now maintain joint rates over such routes."

Bucyrus-Erie Co. Appoints New Distributor for Georgia

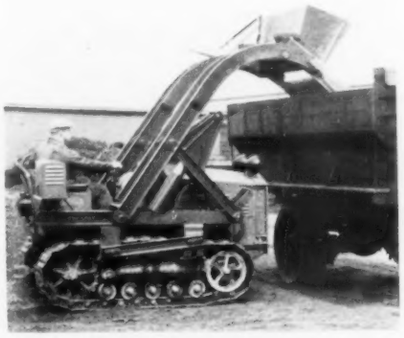
The Bucyrus-Erie Co., South Milwaukee, Wis., announces the appointment of R. S. Armstrong & Bro. Co., 676 Marietta St., N. W., Atlanta, Ga., as distributor for power shovels, draglines, cranes, clamshells, etc., in the state of Georgia. A stock of repair parts will also be carried.

Eddy & Cuthbert, representatives in Michigan for the Productive Equipment Corp., are now located at 709 S. Washington Ave., Lansing.

New Machinery and Supplies

Tractor-Mounted Loader Hydraulically Operated

The Cleveland Tractor Co., Cleveland, O., announces a new utility front end loader for use with Cletrac tractors. Among the purposes for which this unit is designed are loading freight cars and trucks, handling bulk material, levelling dumps, hauling, excavating, etc. Mechanical and operating features include hydraulic operation with two lifting cylinders, eliminating clutches and cables; no counterweights; no projections above or below the tractor to interfere with normal clearances; no attachment to the



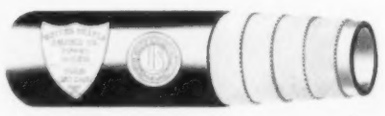
Tractor-mounted loader has wide range of utility.

transmission case, motor frame or springs, the load being carried directly on the side frames and evenly distributed over the lower track wheels. The bucket may be dumped at any height by merely dropping the bottom of the bucket. The drawbar is free for ordinary work. Electrical starting equipment is standard and numerous accessories are available. This unit is designed for mounting on the Cletrac 25 and has a capacity of ½ cu. yd. or 1,000 lb. The unit weighs 9,500 lb. and has a maximum loading height of 8 ft. 6 in.

This loader is designed to permit the removal of the bucket assembly and the installation of a hookup assembly to which may be attached a bulldozer or backfiller blade, lifting forks or similar device. These blades can be used horizontally or angled in either direction. The change from one unit to another, it is claimed, can be made by two men in half an hour because drift pins and keys are used on the plate assembly instead of bolts.

"Tire-Like" Cord Layers Used in New Air Hose

The Mechanical Goods Division of United States Rubber Products, Inc., New York, N. Y., has introduced a brand new type of hose for pneumatic tool and air drill service—an air hose built like a tire. The body of the hose is made with each layer of "tire-like" cords laid in tough rubber cushions, isolated from adjacent layers to prevent rubbing or shearing. As a result, it is claimed, the hose will withstand any amount of pulsation, sudden expansion



Automobile tire construction used in new air hose.

under pressure, or constant flexing in use.

This new kind of hose carcass, it is said, makes this "U. S." Super Royal Cord so tough and resilient that it shows a remarkable resistance to external blows, bruises and abrasions. The durability is due both to the internal structure and the specially compounded brown rubber cover which will stand unusual abuse and will not peel off when cut or gouged. Special oil-resisting rubber has been used to combat the destructive action of hot oil in the air line.

Convertible Shovel Made in Two Improved Models

The Link-Belt Co., Chicago, Ill., announces two new models of crawler-mounted shovels, cranes and draglines known as models K-40 and K-45. These new machines are said to retain the basic design of the two machines they replace with many improvements. They are built for heavy-duty service and are arranged for gasoline engine, Diesel engine or electric motor drive. They can be used as shovel, crane, dragline, trench hoe, etc., and may be furnished with any or all of several special attachments. Another feature is the ability to ship the complete machine on a flat car without dismantling.

Both models are standardly equipped with a 22-ft. shovel boom, 16-ft. 6-in. dipper stick, and an all-manganese steel heavy-duty dipper with a struck-measure capacity of 1¼ cu. yd. capacity on the K-40 and 1½ cu. yd. on the K-45. As draglines these units will handle 1¼ to 1½-cu.yd. and 1½ to 1¾-cu. yd. heavy-

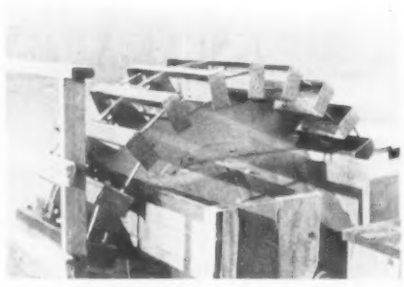
New shovels improved over previous models.

duty buckets respectively on a 40 to 45-ft. boom. As a crane the K-40 has a rated capacity of 21 tons at 12-ft. radius and 6,600 lb. on a 45-ft. radius on a 45-ft. boom. The K-45 is rated at 25 tons and 7,600 lb., respectively under the same conditions.

New Revolving Classifier With Wide Sizing Range

Otis E. Perkins of Portland, Ore., has developed and patented the Perkins Revolving Classifier which has been used in a number of plants in the Pacific Northwest for the past six or eight years. Experience with the machines now in use show that it will save all normal fines, or exclude practically all, and will save any desired percentage between those extremes. One installation made six years ago consists of a two-wheel classifier capable of handling 50 cu. yd. of material per wheel per hour. In spite of almost steady operation no repairs are said to have been necessary except the renewal of a few worn buckets and the building up of the lips with hard metal.

The classifier consists of a series of buckets fixed on the circumference of an angle-iron wheel with an overall diameter of 8 ft. in this case. The wheel is mounted to dip into a tank slightly longer and wider than necessary to admit the wheel. The material is sluiced into one end of the tank while the water and silt together with undesired fines leave the other end at a slightly lower level. The coarser material sinks to the bottom of the tank where it is dipped up by the buckets. As the bucket rises the water leaving the bucket gently washes the material out, silt first, then the finest sand, and gradually coarser material. At a point near the vertical position all the undesired fines will have been washed out. An apron of sheet metal catches the balance of the material as the bucket passes the vertical position.



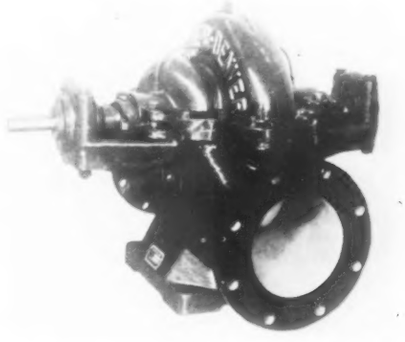
Revolving sand classifier uses closed circuit.

The gradation of the material is accomplished by a combination of three conditions. It is controlled by the speed of the wheel, the position of the apron collecting the bucket discharge and by the volume and speed of the water and materials through the tank. The discharge of the unwanted material back into the tank permits recirculation of any coarse which may not have been removed the first time.

Double-Suction Pumps for High-Efficiency Service

The Gardner-Denver Co., Quincy, Ill., announces a new line of double-suction centrifugal pumps for high-efficiency service. These pumps are the single-stage split-case type and are designed for any type of drive, including flat belt, V-belt, direct-connected, gas or Diesel engine, although the usual drive is direct-connected to an electric motor. All pumps in this line, known as series D, E, F and G, are identical in construction, the only difference being the dimensions. This series covers all heads up to about 300 ft.

A number of features are pointed out by the manufacturer among which is the location of the shaft sleeve nut. This is on the outside of the pump and next to the



Double-suction centrifugal pump for high-efficiency service.

pump housing, a convenience in tightening sleeves. This nut is also used as a jack to remove the ball bearing, no puller being required. The bronze impellers are of double-suction enclosed type, hydraulically balanced. The casing is of cast iron and the casing is split on the horizontal centerline to permit access to the interior without disturbing the pipes. The shaft is of heat-treated high-carbon alloy steel and the shaft sleeves are cast bronze. Bearings are ball type and are enclosed in splash-proof and dust-proof housings.

Bucket Dump Designed for Quarries Using Hand Loading

Dempster Bros., Inc., Springdale Ave. and Southern Ry., Knoxville, Tenn., have developed the Dempster Bucket Dump which is designed for hauling stone in hand-loading quarries. This device can be

Truck-mounted bucket dump for hand-loading quarries.

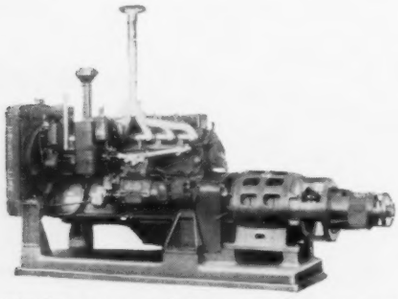
mounted on either new or rebuilt trucks and can readily be dismounted when desired. It consists essentially of a steel framework mounted on the truck chassis capable of picking up, elevating and dumping buckets of stone. These buckets are detachable and can be placed at points most convenient for loading, the number of buckets used with each unit depending on conditions.

The buckets are only 28 inches high, making hand loading easy and are of heavy electric-welded construction. The bucket is picked up and handled on the dump by cable controlled by a hydraulic hoist. Control is worked out in such a manner that it is said to be impossible to hoist the bucket too far or drop it too quickly. The bucket is dumped by engaging two heavy hooks which automatically drop into neutral position after the bucket is dumped. No brakes, frictions or clutches are used and all operations are controlled by the truck driver.

P & H and Caterpillar Join in Making of Diesel Generator

Joint announcement is made by the Harnischfeger Corp. of Milwaukee and the Caterpillar Tractor Co. of Peoria, Ill., of a co-operative arrangement for building Diesel-powered generator sets which will bear the name plate, "Harnischfeger-Caterpillar."

Offered in capacities ranging from 35 to 60 KW, these sets are said to fill all AC and DC current requirements for service in mines, quarries, construction camps, municipalities, etc. Generators are of the single-bearing type directly connected by link coupling to the Diesel engine and mounted on a substantial cast iron base.

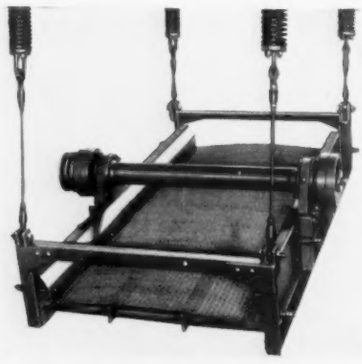


Diesel generator made by co-operative agreement between manufacturers.

The standard unit will include the engine with all auxiliaries, radiator cooling system, starting engine, auxiliary fuel pump, engine controls to provide proper speed setting and close governing, coupling between engine and generator, flywheel and coupling guard and the generator mounted on the unit base.

Single-Deck Screen Designed for Fine or Medium Sizing

The Allis-Chalmers Mfg. Co., Milwaukee, Wis., announces that a new, sturdy, low-priced single-deck screen has been added



Low-priced single-deck screen added to line.

to the "Aero-Vibe" line. This screen is suspended by cables and springs and is vibrated by adjustable counter-weighted wheels. It is designed to handle medium to fine-sized materials either wet or dry and is made in all sizes from 1½ to 3-ft. to 5 by 10-ft.

Churn Drill with All-Steel Welded Frame Uses Wire Line

The Bucyrus-Erie Co., South Milwaukee, Wis., announces the new Bucyrus-Armstrong 21-W churn-type drill for drilling holes to 300 feet in depth and to six inches in diameter. This drill is said to make available the drilling action of the No. 26 blast-hole drill and the 26-P prospecting drills at a lower price. The 21-W is of welded all-steel construction capable of handling a thousand pounds of tools. It is equipped with the Bucyrus-Armstrong rubber shock absorber which makes practical the use of wire line. Power is furnished by a heavy-duty 4-cyl. industrial gasoline engine. The 21-W may be mounted on a drill boat by simply removing the wheel mounting and setting the machine on two skids. These machines are available for truck mounting, on two or four-wheel trailers, or for team or tractor haul.

Churn-type drill of all-welded steel construction.

Rehandling Grab Bucket Has High Capacity-Weigh Ratio

The Mead-Morrison Division of the Robins Conveying Belt Co., New York, N. Y., has developed a new light rehandling grab bucket known as Type RH which is said to be exceptional in its relation of capacity to weight. The special shells are of an intermediate shape between flat and round, giving the advantage of the flat

Rehandling grab bucket of light-weight construction.

shell for digging and the round shell for quick discharge. Its low height and extra width result in a low center of gravity. It has a rope reeving without reverse bends and a three-part purchase for rapid opening and closing. The top head is structural steel with a manganese steel fairleader bolted in; the hinges are of cast steel of single and double ear construction with large bearings; all bearings are provided with high-pressure lubrication. The links are of large-diameter steel tubing welded to the cast steel ends.

Streamlined Cab-Over-Engine Trucks Have Roll-Out Engines

Mack Trucks, Inc., New York, N. Y., announces new styling on Traffic Type trucks, Models CH and CJ, the cab-over-engine models. These trucks now have modernly-styled streamlined coupe cabs with integral all-metal roof construction. Another development is the use of a roll-out power plant removable through the front. Shorter wheelbases for given plat-

New model streamlined trucks have all-metal roof construction.

form lengths have also been made possible by further setting back of the front axle.

The roll-out power plant permits the removal of the engine, clutch, transmission and radiator as a unit through a subframe mounting with its own rollers. It is said that one man can remove or replace the power plant in about an hour and a half. The four rollers on this subframe are idle when in position, the subframe being then rigidly locked to the main frame by twelve large bolts. The withdrawal operation merely requires the removal of the radiator grille and bumper, the lifting of the engine inclosure within the cab and the disconnecting of the power plant. All electrical connections are disconnected with one motion.

Wheelbases are 6 inches less than on previous models but the one-third, two-thirds weight distribution has been retained along with shorter turning radii. Mechanical details other than the above remain unchanged, the CH being powered by a 108-hp. engine and the CJ by one of 118 hp. Drive from the single-plate dry clutch is taken through a four-speed selective sliding gear unit-with-engine transmission and thence through a two-part driveshaft with four universal joints to a dual-reduction rear axle. Springs are long and connected with the frame through rubber shock insulators.

Two-Wheel Derricks Built for Quick Connection to Tractor

R. G. LeTourneau, Inc., Peoria, Ill., and Stockton, Cal., announce a new 2-wheel derrick for use with tractors. This derrick consists of but three main parts: boom, tongue and wheels. It is operated by means of a 2-drum power unit mounted at the rear of the tractor, one drum operating the hoist line and the other the boom. Line speed varies from 65 to 400 feet per minute, depending on the rigging. The

Design two-wheel derrick for use with tractor.

capacities of these derricks depend on the size of the tractor to which they are attached. The 20-ft. boom derrick on a "75" will lift 12½ tons and carry 10 tons while on a "20" the same boom will lift 5 and carry 3 tons. This derrick can be connected to or disconnected from the tractor by simply dropping the draw bar pin.

Diesel-Powered Auto Completes Trans-Continental Economy Run

C. L. Cummins, president of the Cummins Engine Company, Columbus, Ind., completed his trans-continental economy tour at Los Angeles, on July 4. In a leisurely trip from New York City to Los Angeles, he covered 3,774 miles, averaging 34.62 miles per gallon.

He was driving a standard Auburn Phaeton equipped with a new and smaller 6-cylinder Cummins Engine, which burns Diesel fuel oil, and the total cost for the fuel for the entire coast-to-coast trip was $7.63. The engine is rated at 85 hp. at 2200 r.p.m., and it is said to be the first production model Diesel engine to be installed in a standard American passenger automobile. Although the engine is designed and will be used mainly for light truck service, it is so smooth in operation, free from vibration, and flexible that it also makes an ideal passenger car engine.

Fuller Co. Locates Pacific Coast Sales Office in San Francisco

The Fuller Company, Catasauqua, Pa., has opened a district office at 564 Market St., San Francisco, Cal., to handle both sales and servicing of Fuller-Kinyon conveying systems, "Airveyor" pneumatic conveyors, rotary compressors and vacuum pumps in the Pacific Coast states.

The engineer in charge is Jose M. Alonso, formerly manager of the Chicago district office.

Hercules Motors Moves West Coast Office to Los Angeles

The Hercules Motors Corp., of Canton, O., announces the removal of their West Coast office from San Francisco, Cal., to Room 523, Transamerica Bldg., 8th & Oliver Streets, Los Angeles. Oliver Kelley, who is direct factory representative for the Hercules Corp., will be located at the new address.

Deep-well pump made by the Peerless Pump Co. installed in the Warner Co. lime plant at Cedar Hollow, Pa.

MANUFACTURERS' PUBLICATIONS

Direct Current Motors. 4 p. (Leaflet 2183, Allis-Chalmers Mfg. Co., Milwaukee, Wis.) Describes and illustrates the important features of the direct current motors made by this company.

Pumps. (Bulletin 201, Lawrence Machine & Pump Corp., Lawrence, Mass.) Describes their double suction, horizontally split pumps and their possible applications.

Mills. (Bulletin Ah-323, Hardinge Co., York, Pa.) Bulletin describes and illustrates the applications of the Hardinge-Hadsel mill, which has been developed over the past four years by this company.

Journal Bearings. 8 p. (National Bearing Metals Corp., St. Louis, Mo.) Pamphlet describes the new Security bond oil control journal bearing developed by this company.

Dust Control. (Pangborn Corp., Hagerstown, Md.) A circular advertising Bulletin No. 197 containing data on the "CH" all metal, cloth, screen, dust collector.

Diesel Engines. (The Cooper-Bessemer Corp., Mt. Vernon, O.) Describes a Diesel engine of 25-110 B. H. P. specifically developed for stationary service for the small power user.

Sump Pump. (Worthington Pump and Machinery Corp., Harrison, N. J.) A folder illustrating and describing important details of the Worthington Sump Pump No. 5.

Insulation in the Lime and Cement Industries. 54 p. (Johns-Manville, New York, N. Y.) This booklet describes and illustrates the uses of insulating materials, manufactured by this company, in the lime and cement fields.

The Care of Rubber Tires. 4 p. (B. F. Goodrich Co., Akron, O.) A pamphlet titled "Twelve Rules for Tire Health," by K. D. Smith, Tech. Supt., Tire Div. of the company.

Conveyors. (Chain Belt Co., Milwaukee, Wis.) A booklet illustrating and describing the various types of material-handling equipment manufactured by this company.

Suction Pumps. (Bull. 202, Lawrence Machine & Pump Corp., Lawrence, Mass.) The pamphlet describes and illustrates different types of pumps made by this company.

Foot Guards. (The Strauss Co., Inc., Pittsburgh, Pa.) A pamphlet illustrating the outstanding features of the new Strauss Foot Guard No. FG-3.

Mechanical Rubber Goods. 56 p. (The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J.) A general catalogue describing the complete line of standard rubber products manufactured by this company for industry.

Powder. (Hercules Powder Co., Wilmington, Del.) A booklet describing Pellet "D", a new powder that offers miners the important advantages of reduced smoke and fumes.

Power Shovel. (The Star Drilling Machine Co., Akron, O.) A pamphlet describing the patented telescoping handle power shovel manufactured by this company.

Light Weight Power Shovel. 15 p. (The Harnischfeger Corp., Milwaukee, Wis.) A booklet describing and illustrating the new "Bantam Weght" power shovel.

Electric Excavator. (Bull. No. 359, Marion Steam Shovel Co., Marion, O.) A bulletin illustrating and tabulating the outstanding features of the new Type 4101, 2½-cubic yard Marion electric shovel.

Pyranol Capacitors. 26 p. (GEA-77H General Electric Co., Schenectady, N. Y.) A booklet describing and illustrating capacitors using the fluid pyranol, manufactured by this company.

Cooling Systems. 7 p. (Bull. 70, Binks Mfg. Co., Chicago, Ill.) The bulletin illustrates and describes the Binks cooling tower which may be located near or adjacent to a plant or process requiring cooled water.

Bucket Dumps. (Dempster Bros., Inc., Knoxville, Tenn.) A pamphlet describing and illustrating the simplicity of construction and action of the Dempster bucket dumps.

Steel Plates and Sheets. (Joseph T. Ryerson & Sons, Inc., Chicago, Ill.) A pamphlet describing the Ryerson abrasion resisting steel and its applications.

Diesel Engines. (Cooper-Bessemer Corp., Mt. Vernon, O.) A bulletin describing "Type GA Single and Twin Cylinder Horizontal Diesel Engines," and a Diesel engine of 25-110 b. h. p. specifically developed for stationary service for the smaller power user.

Machinery Bargains. (Bull. No. 93, Machinery Sales Corp., Chicago, Ill.) Bulletin lists a great number of machines this company has available for sale.

Portable Belt Conveyors. (Bull. No. 1414, Link-Belt Co., Chicago, Ill.) Describes and illustrates cost-reducing, time-saving portable belt conveyors manufactured by this company.

Vibrating Screens. (Iowa Mfg. Co., Cedar Rapids, Ia.) A folder describing the Cedar Rapids Symons screen made by this company.

Pumps. 15 p. (Bull. No. CP 11, Gardner-Denver Co., Quincy, Ill.) Describes and illustrates the side-suction centrifugal pumps now being introduced by this company.

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

Although every effort is made to insure accuracy and completeness in these listings, the publisher cannot accept responsibility for errors or omissions. Any mistakes discovered will gladly be rectified, if brought to the attention of the Advertisers' Service Department.

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*Robins Conveying Belt Co.
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McLanahan and Stone Corp.
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Bonnot Co.
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*Allis-Chalmers Mfg. Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
New Holland Machine Co.
Nordberg Mfg. Co.
Smith Engr. Works

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*Allis-Chalmers Mfg. Co.
Bonnot Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
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*Allis-Chalmers Mfg. Co.
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Bonnot Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
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Koehring Co.
Pettibone Mulliken Co.

*** See also information in the 1935 Pit and Quarry HANDBOOK.**

Let's Look at Cordeau -- for Jackhammer Holes

Where the formation will permit a number of Jackhammer holes . . .

Where the location will permit a single large shot in place of a lot of small ones . . .

There is where you may find it profitable to use Cordeau-Bickford, the *insensitive* Detonating Fuse.

Cordeau acts as the detonating agent in each load, and connects all holes in one pattern that "goes" as a single blast. It carries a powerful detonating wave at a speed of approximately three miles per second, resulting in the practically instantaneous explosion of all loads on the line. A cap is attached at one end of the Cordeau pattern just before shooting, and is fired with fuse or battery.

Consider each of the five savings afforded by Cordeau—and add CONTROL . . . blasting *planned* for easy removal, *timed* to the fraction of a second.

Let's look at Cordeau for Jackhammer holes—and remember, it is a natural for well-drill, wagon drill, pocket and tunnel blasting, demolition, irrigation and submarine work.

CORDEAU PAYS IN 5 WAYS

1. Simplified loading
2. Less Hazard
3. More work from your explosives
4. Better fragmentation
5. Fewer but bigger shots (Equipment moved less often)

CORDEAU DETONATING FUSE BICKFORD

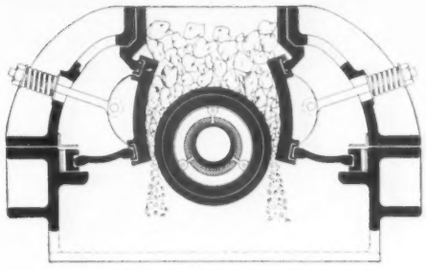
ALSO SAFETY FUSE *Since* 1836

Write for the Cordeau Book

The ENSIGN-BICKFORD COMPANY

CB 45 SIMSBURY, CONNECTICUT

BONNOT CRUSHERS for PROFIT



Note the Bonnot reduction principle featuring *slow creep mantle*, which insures even distribution of wear over the entire crushing area.

SCORES of operators are turning to Bonnot Reduction Crushers to meet today's demand for better materials at lower costs—with increased profits for themselves.

Note these Bonnot features, all contributing to economy:

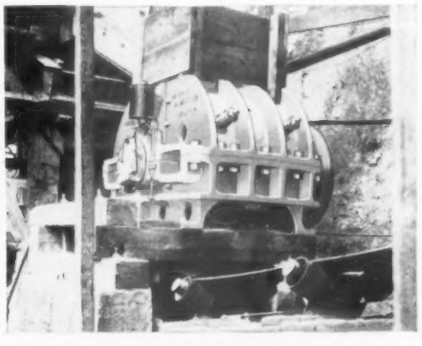
Long Life: Uniform wearing area with six times the average wearing surface. No gears, counter shafts or eccentric sleeves to cause mechanical troubles.

Lubrication: Positive force-feed grease lubrication individually adjusted to each bearing.

Power: Field tests show savings up to 50%. Crusher starts easily under full load.

Capacity: Continuous crushing action, without idle or back stroke, gives maximum capacity.

Maintenance: Manganese steel wearing parts. Heavy alloy steel frame. All parts designed for 100% overload. Negligible upkeep cost.



Manufactured Under U. S. Patent No. 1,946,763.

Write for Bulletin No. 160

THE BONNOT CO.

CANTON, OHIO

Since 1891

New York Office—30 Church St.

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

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*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
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Raymond Bros. Impact Pulv. Co.
Sprout, Waldron & Co.

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Portable Crushing and Screening Plants
Iowa Mfg. Co.

Portable Engines (See Engines—Internal Combustion)

*** See also information in the 1935 Pit and Quarry HANDBOOK.**

WEAR RESISTER

* **Protects vital parts from wear**
* **Prolongs pump life**
* **Reduces repair costs**
* **Eliminates costly shutdowns**
* **Increases production**

The Wear Resister is the most far-reaching development in dredge pump history—it stops destructive abrasion and gives to Diamond Dredge Pumps a new record of service. It also may be applied to your present pump—let P.M. Co. engineers show you how. Write for Bulletin of the "Wear Resister."

PRODUCTS OF P.M. CO.

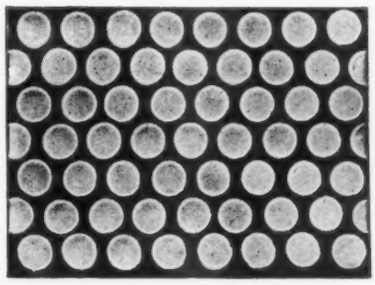
Pump Parts:	Dipper Parts:
Shells	Fronts } Black
Impellers	Lips } Patent
Side Levers	Backs

Pumps Complete (Wear Resister) — Dipper Teeth — Dippers Complete—Crusher Parts—Screen Plates.

PETTIBONE MULLIKEN CO.

4712 Division St., Chicago, Ill.

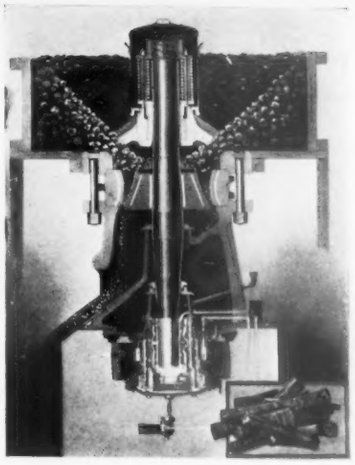
MORROW SCREEN PLATES



MORROW PERFORATED METAL SCREEN PLATES for sizing and preparing coal, sand, gravel, stone and other bulk materials are made by a Company specializing in screening machinery.

A complete set of punches and dies covering a wide range of sizes, in round, square, oval and diagonal slots are ready for the press, insuring prompt delivery of orders.

The Morrow Manufacturing Co.
Wellston, Ohio



GREATER TONNAGE with HALF THE POWER COST *Guaranteed!*

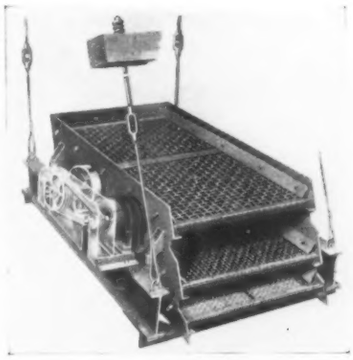
THE Kennedy Ball Bearing Gearless Gyratory Crusher is guaranteed to produce a greater tonnage than any other crusher of a given size, with half the power per ton of ore. This crusher can be equipped with a synchronous motor in its pulley, or driven by flat or V-belt from a standard motor.

The Savings Effected with this crusher are astounding:
In cost of Maintenance.....80%
In Power.....The entire cost of crusher and motor in pulley is amortized annually.

Sieving test on glacial gravel crushed at the rate of 18 tons per hour, with No. 19 crusher set to ⅛ in., and using less than 15 hp., follows:

Minus ⅜ in.	100%
Plus 3 mesh	21½%
Minus 3—Plus 4	17%
Minus 4—Plus 14	36½%
Minus 14—Plus 48	15%
Minus 48—Plus 100	4%
Minus 100	5½%

KENNEDY VIBRATING SCREEN



Built in open or enclosed types, in widths ranging from 3′ to 6′ with one or more decks. It can be suspended, or supported from the bottom.

Suitable for scalping oversize from primary crushers, as well as smaller sizes, and chemical products.

The entire screening surface is effective, thereby insuring greatest capacity.

Equipped with self-aligning main bearings which account for low power consumption and also for long life of bearings.

Screen drive shaft is positioned near the feed end for balancing purposes and is patented.

Write today for our Catalog No. 16-P-835

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2 Park Avenue New York, N. Y.

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Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

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Portable Loaders (See Loaders and Unloaders)

Power Cables (Rubber Clad)
*American Steel & Wire Co.

Power Shovels (See Shovels, Electric, Internal-Combustion and Steam)

Pulleys (Magnetic)
Sprout, Waldron & Co.

Pulleys (Wing)
Sprout, Waldron & Co.

Pulverized Fuel Systems
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Raymond Bros. Impact Pulv. Co.

Pulverizers (See also Crushers; Mills; etc.)
Bonnot Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
New Holland Machine Co.
Raymond Bros. Impact Pulv. Co.

Pump Valves (See Valves Pump)

Pumps (Cement Slurry)
*Allen-Sherman-Hoff Co.
*Morris Machine Works

Pumps (Centrifugal)
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Hetherington & Berner Inc.
Kansas City Hay Press Co.
*Morris Machine Works
Pettibone Mulliken Co.

Pumps (Dredging)
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Hetherington & Berner, Inc.
*Morris Machine Works
Pettibone Mulliken Co.

Pumps (Sand and Gravel)
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
*Morris Machine Works
Pettibone Mulliken Co.

Pumps (Vacuum)
Fuller Co.

Respirators
Goggle Parts Co.

Respirator Parts
Goggle Parts Co.

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Rod Mills
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

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American Manganese Steel Co.
McLean Welded Products Corp.
Ryerson & Son, Joseph T.

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Ryerson & Son, Joseph T.

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*Link-Belt Co.
McLanahan and Stone Corp.
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*Hardinge Co.

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Iowa Mfg. Co.
*Link-Belt Co.
Smith Engr. Works

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Iowa Mfg. Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

Screens
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
*Deister Concentrator Co.
*Deister Machine Co.
*Eagle Iron Works
Gay, Rubert M.
Haiss Mfg. Co., Geo.
*Hardinge Co.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
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Morrow Mfg. Co.
Nordberg Mfg. Co.
*Productive Equip. Corp.
*Robins Conveying Belt Co.
*Roebling's Sons Co., John A.
Smith Engr. Works
Smith Wire & Iron Works, F. P.
Sprout, Waldron & Co.

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*Allis-Chalmers Mfg. Co.
*Deister Concentrator Co.
*Deister Machine Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
Nordberg Mfg. Co.
*Productive Equip. Corp.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.

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*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Eagle Iron Works
Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Link-Belt Co.
McLanahan and Stone Corp.
Pettibone Mulliken Co.
Sprout, Waldron & Co.

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*Harnischfeger Corp.
Koehring Co.
*Lima Locomotive Works, Inc.
*Link-Belt Co.

Skip Hoists and Skips
*Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
*Link-Belt Co.
*Robins Conveying Belt Co.

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Iowa Mfg. Co.
*Link-Belt Co.

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Sprays
*Deister Concentrator Co.

Sprockets and Chain
American Manganese Steel Co.
Iowa Mfg. Co.
*Link-Belt Co.
Pettibone Mulliken Co.
Sprout, Waldron & Co.

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Smith Wire & Iron Works, F. P.

Stairs (Mine)
Smith Wire & Iron Works, F. P.

Steel (Alloy)
(See Alloys—Steel)

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Ryerson & Son, Joseph T.

Steel (Bars, Shapes, Plates, etc.)
Ryerson & Son, Joseph T.

Steel Grating (See Grating, Steel)

Steel Inclines (See Inclines, Steel)

Steel Plate Construction
*Hendrick Mfg. Co.
Hetherington & Berner, Inc.
Sprout, Waldron & Co.

Storage Equipment
Haiss Mfg. Co., Geo.
*Link-Belt Co.
*Sauerman Bros., Inc.

Sweatbands
Goggle Parts Co.

Sweeping Systems
*Allen-Sherman-Hoff Co.

Tanks
*Hendrick Mfg. Co.
*Link-Belt Co.

Tanks (Sand-Settling)
Iowa Mfg. Co.
*Link-Belt Co.
Morrow Mfg. Co.
Smith Engr. Works

Testing Sieves and Shakers
*Hendrick Mfg. Co.

Thickeners (Slurry)
*Hardinge Co.

Tire Repair Materials
Goodyear Tire & Rubber Co.

Tires (Truck, Passenger Cars, Tractor)
Goodyear Tire & Rubber Co.

Tools (Drill) (See Drilling Accessories)

Track Equipment
Pettibone Mulliken Co.

Track Shifters
Nordberg Mfg. Co.

Tractors
*Allis-Chalmers Mfg. Co.

Tramways (Aerial)
*American Steel & Wire Co.
*Roebling's Sons Co., John A.

Transformers
*Allis-Chalmers Mfg. Co.

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Transmission Machinery
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Link-Belt Co.

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*Link-Belt Co.
*Robins Conveying Belt Co.

Truck Cranes (See Cranes)

Truck Mixers
Jaeger Machine Co.

Trucks and Trailers (See Motor Trucks)

Tube-Mills (See Mills—Ball, Tube, etc.)

Tubes (For Tire Casing)
Goodyear Tire & Rubber Co.

Underground Loaders
*Allis-Chalmers Mfg. Co.

Unloaders (Box Car)
*Link-Belt Co.

Valves (Pump)
Taylor Forge & Pipe Works

Variable Speed Reducers or Transmissions
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Vibrating Screen Plate
Chicago Perforating Co.
*Hendrick Mfg. Co.
*Link-Belt Co.
Morrow Mfg. Co.

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Koehring Co.

Washers (Sand, Gravel and Stone)
*Allis-Chalmers Mfg. Co.
*Eagle Iron Works
Haiss Mfg. Co., Geo.
*Hardinge Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
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Ryerson & Son, Joseph T.

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Goggle Parts Co.

Welding Supplies
American Manganese Steel Co.
*American Steel & Wire Co.
McLean Welded Products Corp.
*Roebling's Sons Co., John A.
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Well Drills (See Drills—Well)

Wheels (Car)
American Manganese Steel Co.
*Eagle Iron Works
Iowa Mfg. Co.
Pettibone Mulliken Co.

Wheel Rims. See Rims—Wheel

Winches and Capstans
*Link-Belt Co.
*Robins Conveying Belt Co.
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Wire & Cable (Electric)
*American Steel & Wire Co.
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Ludlow-Saylor Wire Co.
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*American Steel & Wire Co.
McLean Welded Products Corp.
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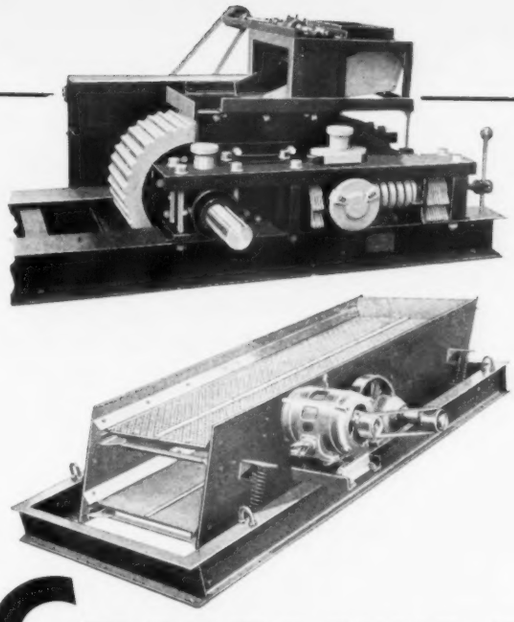
Ryerson & Son, Joseph T.

Worm Gears (See Gears and Pinions)

*** See also information in the 1935 Pit and Quarry HANDBOOK.**



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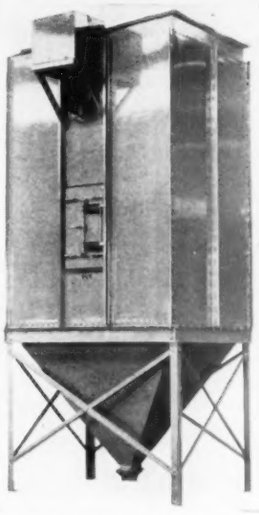
a word about YOUR DUST and what it COSTS you



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Don't overlook the DUST IN YOUR plant thinking it doesn't matter,—for it costs you REAL MONEY. Any way you look at it YOUR DUST is a tremendous expense. It is cheaper to install the New Dracco Multi-Bag Filter because it saves you money in 4 important ways,—(1) Increases efficiency of the plant; (2) Prolongs life of equipment and reduces maintenance cost; (3) Better health conditions; (4) Protection against law suits. This New Filter is HIGH in Dust Collecting Efficiency and LOW in Initial Cost, Operating Cost and Maintenance Cost. It has NO FRAMES or SCREENS. Write for Bulletin No. 301.

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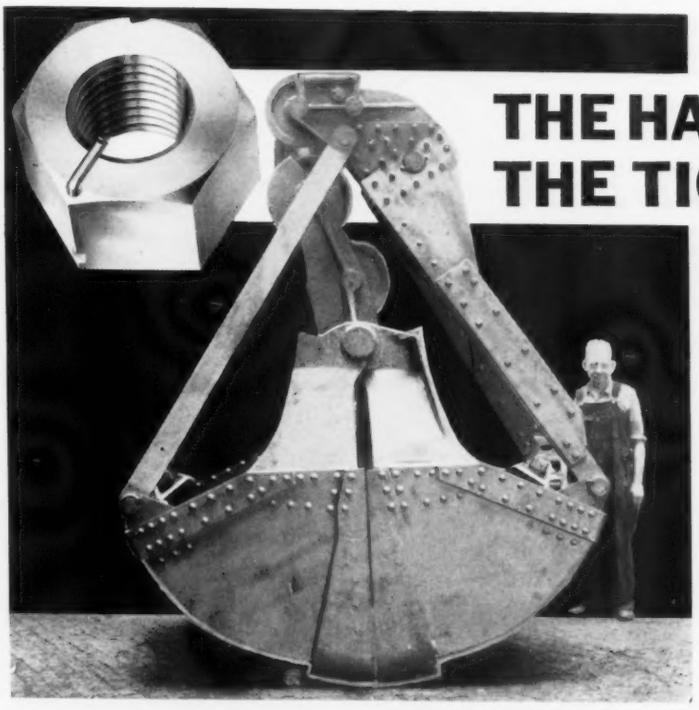
WRITE FOR BULLETIN NO. 301

DRACCO CORPORATION

Successors to The Dust Recovering & Conveying Co.

4077 E. 116th St. — Cleveland, Ohio



THE HARDER THE STRAIN THE TIGHTER THEY HOLD

YOU can have "unshakable confidence" in your equipment when it is securely bolted with ANCO NUTS * * * the modern lock-nuts that are eliminating "loose methods" in assembly and preventing other costly machine casualties wherever used.

Consider this brute of a bucket, for example—a huge 4-yard Williams Cleanup Bucket of the Power-Arm Type. It is necessary to make the removable parts just as secure and dependable as the riveted portion, and therefore:—

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FOR USE WHEREVER A GOOD NUT IS REQUIRED, SCREENS, CONVEYORS, CLAM SHELL BUCKETS, CRUSHERS, ETC.

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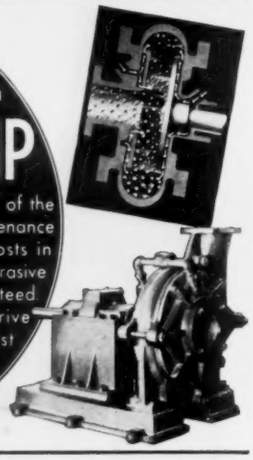

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Lewistown Foundry Products
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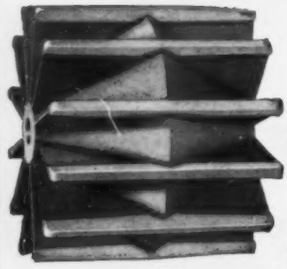
Performance-Tested

BUCKET ELEVATORS
REVOLVING SCREENS
CRUSHERS DRY PANS

Lewistown Foundry & Machine Co.
Lewistown, Pa.

SAVE YOUR CONVEYOR
and
Elevator Belts *with* SPROUT-WALDRON Wing Pulleys



Interchangeable with standard pulleys. Nothing can lodge between belt and pulley.

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Elevating, Conveying and Transmission Equipment

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Lenses for Chipping, Dust & Welding • Goggles • Headbands
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- ☐ Gears
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- ☐ Guns, Hydraulic
- ☐ Hoists, Air
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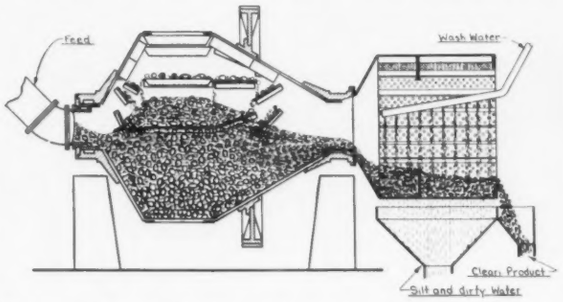
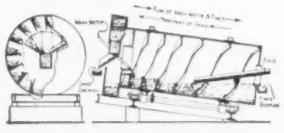


The Hardinge Conical Scrubber

is the only unit that will give a complete reduction of Clay Balls and assure clean Gravel, Stone or Sand.

For moderate washing, classifying, dewatering or dissolving, use

The Hardinge Counter-Current Classifier



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Chicago—205 W. Wacker Drive
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..that's why JAEGER TRUCK MIXERS Outsell All Others

Because they offer every facility for the faster delivery of better concrete ("Dual-Mix" action, 1-man chute, dual controls, rapid accurate water tank and patented discharge) Jaeger Truck Mixers get most of the jobs, serve them at lowest cost, and continue to outsell all other makes. Sizes 1 to 5 cubic yards.

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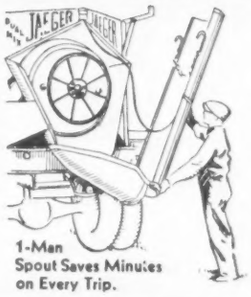

1-Man Spout Saves Minutes on Every Trip.

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Perforated Metals—Screens of All Kinds—For Sand, Gravel, Stone, Etc.

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Parsons Oval Bag Dust Arrestors combine the advantages of the screen and cylinder types.

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Screens, Belt Conveyors

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Gates *and* **Feeders**

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Only the SELECTRO by JIGGER GIVES YOU A VIBRATING SCREEN WITH—

1. Selective Vibration, Throw
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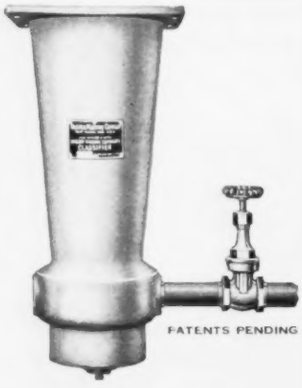
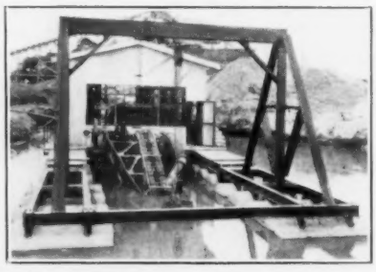


EAGLE SWINTEK SCREEN NOZZLE LADDER LOWER YOUR COST



Will eliminate stoppages and slug pumping—insuring an even, constant feed of solids to the suction nozzle—with less power—greatly decreasing the cost per yard of material produced.

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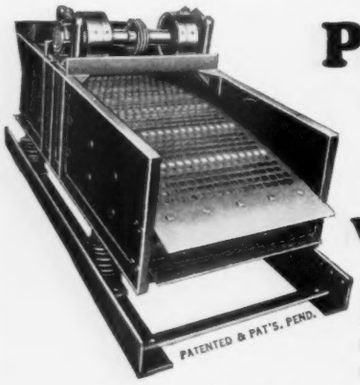

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Improved Heavy Duty

VIBRATING SCREEN

Built in all standard sizes and in from one to three decks.

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are popular in the quarry fields. They wear well. Full range of sizes

Heat-Treated Double-Corrugated Plates

with square, round and "Sqround" perforations. Write for data, particularly on the new "Sqround" Mesh.

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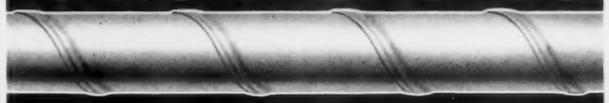

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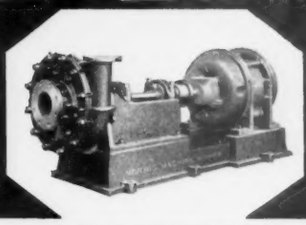

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SCREENS—*GUARANTEED SERVICE*

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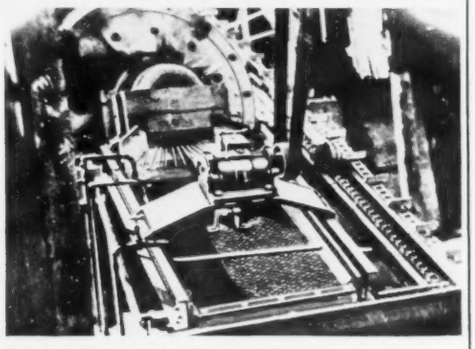

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Cedar Rapids-Symons Screen
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A BETTER SCREEN FOR ALL SCREENING JOBS
MADE IN A COMPLETE RANGE OF SIZES

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CEDAR RAPIDS, IOWA

SAUERMAN
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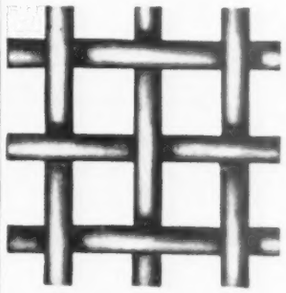

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Tough and Economical

Made of a special Spring Steel Wire to resist extreme abrasion and withstand severe vibration.

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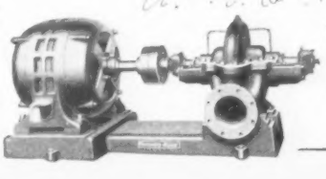
High efficiency — low operating cost — precision workmanship — wear-resisting, non-heating bearings even when operated under extremely high heads.



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16″ Hydraulic Dredge Steel Hull

97-ft. x 17-ft. 6-in. with wooden sponsons attached, total width 33-ft. 6-in., draft 7-ft. 6 blade cutter, blade detachable, 500 hp. Morris Machine main engine. Babcock & Wilcox boiler. Main pump Morris Machine Works, 16″ intake, 16″ discharge.

Can be converted for use in the Erie Canal.

Also: 1—36 ft. Tug with heavy duty, Palmer engine.

Priced right for quick sale.

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30—Rock drills, Ingersoll-Rand X59.
10—Drifters, Ingersoll-Rand 570. New.
25—DCR-23 Ingersoll-Rand rock drills.
15—Sullivan plug and feather drills.
30—"Barre" pneumatic carving tools, BL, CL, DL.
1—Air receiver, 42″ x 8′.
25—Steel hoisting blocks, up to 20″ sheave.
2—Bucket elevators 32′ centers, complete.
3—Whitcomb 20 ton, gas locos., 36″ ga. rebuilt.
1—Northwest Model 105 gas crane, caterpillar.
1—Lot of columns, arms and clamps, Ingersoll-Rand.
3—310′ gas, portable, 1-R, air compressors.
2—Caterpillar tractors, No. 60, gas, with bulldozers.
1—Shovel-crane combination Lorraine, 1¼ yd. cap.
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1—Locomotive, Vulcan, gas, 4½ tons, 36″ ga.
25—Clamshell, tip over and skip buckets.

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Valves and Fittings
Suitable for All Practical Purposes
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1—12-ton standard gauge Whitcomb Gas Locomotive, Airbrakes, new 1935.
1—75-B Lorain Gas Shovel, 1¼-yd. new late 1931.
1—20-ton cap. P. & H. Gas Crane, 60′ Bm. used 4 months, like new.

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NEW•USED RECLAIMED FROM ⅛ To 72″
Cut to Sketch and Stocked
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Portable and stationary, belt, with elec. or gas. power, sizes from 21 cu.ft. to 1000 cu.ft.

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246—Buckets, all sizes and makes.

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Large lot including std. ga. 6 and 12-yd. and 20-yd., 36-ga. 5 yd. and 24-ga. 1½-yd. Also std. ga. flat cars and ballast cars.

48—Koppel Quarry cars 42" ga. 2½ yd. One way side dump.

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1—Stationary: Barber-Greene 18"x 100'.

11—Bucket elevators; 6 Chain Belt Co. and Weller and Link Belt vertical enclosed type; capacities from 35 to 117 tons per hour. 5—Weller inclined type Nos. 3, 4, 5 and 6 up to 170 yds. per hr.

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5—Locomotive cranes; sta. ga. 30 and 25-tons; Ohio, Browning, American, Industrial.

1—American 15 ton gasoline powered locomotive crane on 8 wh. MCB trucks, 50 ft. boom. Model 158-G.

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1—Link-Belt K-55, Ser. 1450 comb. shovel and dragline, 70-ft. boom, 2 yd. Page bucket.

1—Northwest Model 104, Ser. No. 2079, 45' boom, 1¼-yd. dragline or clam shell bucket.

1—Osgood heavy duty gas crane, No. 2054, 40-ft. boom, 1-yd. bucket.

6—1-yd. gasoline crawler type cranes. Northwest, Link Belt, P & H, Brownhoist.

3—½-yd. Gasoline crawler cranes. Northwest, Brownhoist and Thew.

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1—Symons coarse cone crusher, size No. 5½, SU No. 521; capacity 450 tons per hour of 2½" material—130 tons per hour of ½" material; weight 85,000 lbs.

1—Set Power and Mining Machinery Co. crushing rolls, size 42 in. x 16 in., rated capacity 15-20 tons per hour of ⅝" material; weight 41,000 lbs.

1—No. 6 Champion jaw crusher, No. U-1075-4; jaw opening 12"x26"; capacity 24-35 tons per hour of 2" material; weight 20,000 lbs. Like new.

2—No. 3 McCulley gyratory crushers; size of each opening 7"x28"; capacity 25 tons per hour of 2¾" material; 11 tons per hour of 1¼" material; weight 17,000 lbs.

SCREENS

2—Allis Chalmers roller type, all steel, heavy duty, 48 in. dia. by 24 ft. long screen in 3 sections.

2—P & M Roller type, 48 in. by 18 ft. long.

1—Allis Chalmers, roller type 51" dia. by 21 ft. long.

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Steel and wood, stiff leg, or guy; from 5 to 50 tons, including 3 steel stiff legs; 1—20-ton Terry 100 ft. boom; 1—10-ton Insley 80 ft. boom and 1—10-ton American, 80 ft. boom.

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3—Gardner Denver wagon or derrick drills with Model 21 or 17 Gardner drills for channelling.

25—Ingersoll-Rand and Sullivan jackhammer column and tripod drills.

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Gasoline, electric and steam. All sizes.

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32—Gasoline locomotives from 14-ton to 2-ton, std. 36 and 24-ga.

1—3 ton 42" ga. Fordson.

1—24-ton Porter steam, saddle tank, cyl. 12"x16" st. ga. Serial No. 5093.

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All sizes and types, both force, centrifugal and steam.

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1—Osgood comb. heavy duty 1-yd. gas shovel and crane, No. 2069.

1—Model "00" Thew crawler mounted gas shovel with ½-yd. dipper.

1—Bay City tractor shovel No. 947, ⅜-yd. dipper, ¾ circle swing.

1—Link Belt K-55 Diesel No. 1450, 70 ft. boom, 2-yd. dragline bucket and shovel front with 2-yd. dipper.

Also Link Belt Shovel attachment for Models K-55, K-44, K-42, K-38 or K-2.

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1—12' Gayco Separator, model 21.
3—Hardinge Mills, 4½'x16", 5'x22", 8'x30".
3—Jaw Crushers 10x7", 24x12", 30x60".
2—Sturtevant No. 1, No. 1½ Rotary Fine Crushers.
1—Sturtevant No. 1 Ring Roll Mill.
4—Gates Gyratory Crushers No. 3D, No. 6D.
5—Traylor Crushing Rolls, 42x18", 36x16".
3—Raymond Mills, two roll, four roll, five roll.
6—No. 0000, No. 00, No. 1 Raymond Mills.
2—Rod Mills 5x10', 4x10'.
2—12" Traylor Bulldog Gyratory Crushers.
1—Symons 7' Cone Crusher.
4—Tyler, Sturtevant Vibrating Screens, single and double units.
6—Hammer Mills, Jeffrey, Williams, Sturtevant.

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FOR IMMEDIATE DISPOSAL!!

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8" Hause Centrifugal Sand Suction Pump, direct motor drive with 100 H.P. General Electric Slip ring A.C. motor—on floating barge.

4" Morris Centrifugal Sand Suction Pump, belted motor drive to 30 H.P. Westinghouse Slip Ring A.C. motor—on floating barge.

8½" x 8" Deming Triplex Pump.

3" Gould Pyramid Pump.

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Selected Special Items

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1—42" Merrick Conveyor Weightometer.
1—8'8"x85' Ruggles-Coles Class A Rotary Dryer; Also 2—5'x26'.
1—5-roll Raymond high side Mill.
2—3-roll Raymond high side Mills.
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5—6'6"x60' Vulcan Rotary Kilns.
1—3'x25' Bonnot Rotary Dryer-Kiln.
1—8'x12' Oliver Rotary Filter.
1—12' Gayco Air Classifier.
5—5'x22' Gates iron-lined Tube Mills.
1—7"x24" Sturtevant Jaw Crusher, to ½".
1—36"x36" Gruendler Hammer Mill, roller bearing, 2IXC.
1—36"x24" Jeffrey type D Hammer Mill.
1—7' Symons Cone Crusher.
2—20x14, 36x16 Sturtevant Crushing Rolls.
1—30x10 Colo. Iron Wks. Crushing Roll.
1—24"x72" Magnetic Pulley, complete.
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2—6'x45' Rotary Dryers—MONEL LINED.
8—3x5, 4x5, 4x7 Tyler Screens.
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17-19 PARK ROW, N. Y. C.
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4—1 yd. Rex motor truck mixers with LeRoi gas engines (only handled 5000 yds.), attractively priced.

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Raymond Mills—No. 00, No. 0 and No. 1.
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Complete drying and asphalt mixing plants.

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Haiss Path Digging Bucket Loader, on wheels.
Sauerman 1-yd. Crescent Power Scraper.
Portable Track, Cars, Switches, Turntables.
Link-Belt 40' Chain Elevator, 12" buckets.
Belt Conveyor Equipment, 16" to 36" wide.
Mechanical Tripper for 18" to 20" Belt.
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Buckets, Hoists, Pumps, Gasoline Engines.
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SIZES ½ YARD TO 2½ YARD
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1—½ yd gas crane or shovel.
1—3' x 6' three deck vibrator screen.
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Wanted: Overhead eccentric type crushers, 9x16, 9x21, 1030 and 1040, roller bearings preferred on larger sizes.

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Used 66"x84"—42"x60"—42"x48"—48"x60", etc.
Gyratory, No. 21—No. 18—No. 12—No. 10—No. 9—No. 8—No. 7½ and smaller. (Used.)
Barge with 12" Pump, etc.
1½-yd. Sauerman Dragline with Auxl's.
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For Light and Heavy Machinery. If a Split Tube will do (it probably will)

Tell us how it is used, and we can make it.

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Lansing, Michigan

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1 conveyor steel, 229 ft. centers.
1 bucket elevator steel, 117 ft. centers.
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½ yd. Sauermar dragline cableway, 600 ft.
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600	G. E. sl. rg.	257
600	G. E. sl. rg.	720
400	West. sl. rg.	514
300	G. E. sl. rg.	585
260	Al. Ch. Syn.	720
250	F. M. sl. rg.	1200
200	West. sl. rg.	900
200	G. E. sl. rg.	900
150	G. E. sl. rg.	1750
150	West. sl. rg.	720
100	G. E. sl. rg.	570
100	West. sl. rg.	1160
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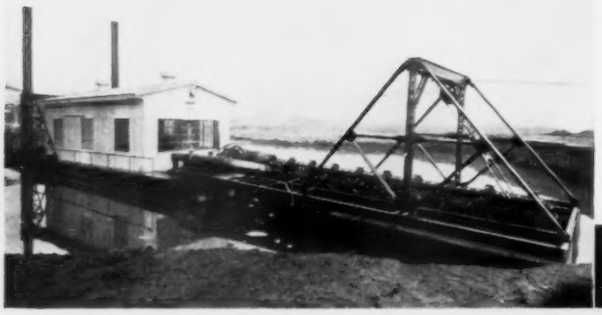

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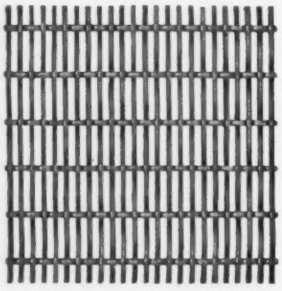

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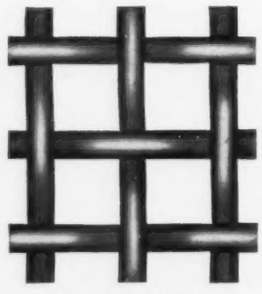

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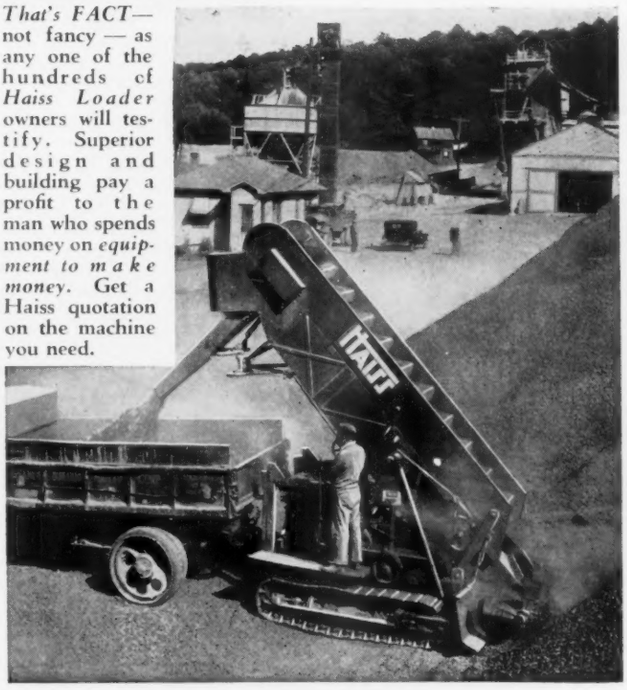

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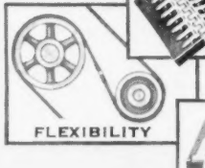

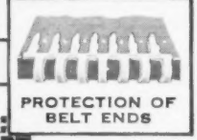

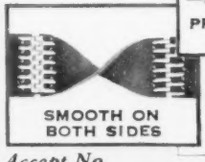

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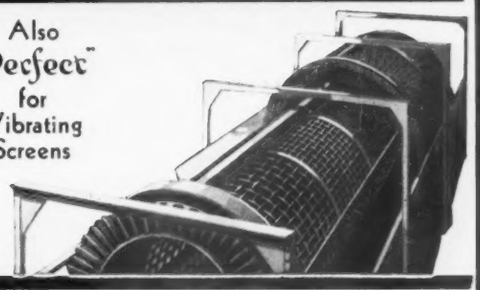

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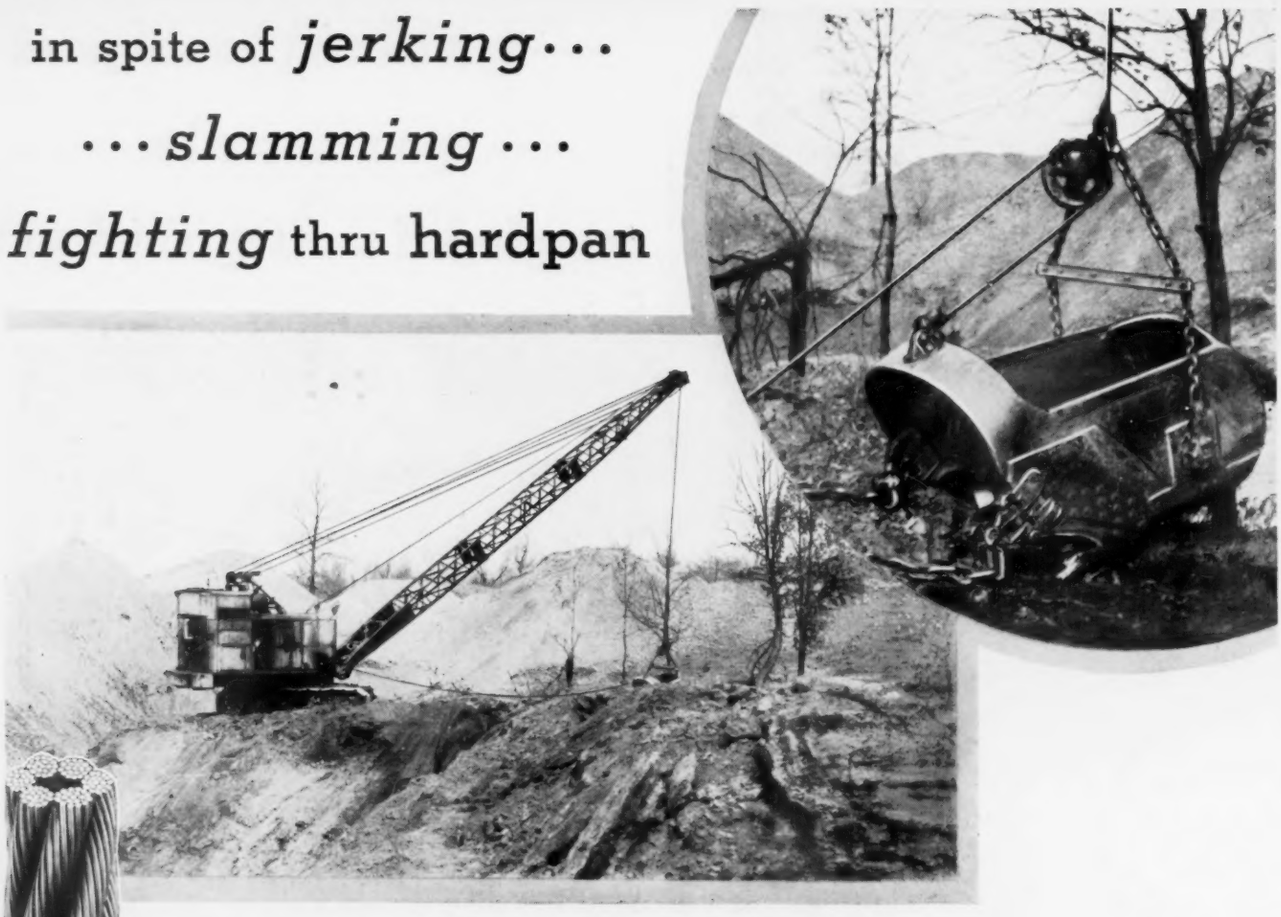
WIRE CO. ST. LOUIS

in spite of *jerking* · · ·

· · · *slamming* · · ·

fighting thru hardpan



TRU·LAY PREFORMED gave 6 times the service!

● No blasting done here. The bucket must plow and break this hardpan overlay. The wire rope must *slam* and *jerk* the bucket through.

Such gruelling punishment only Tru-Lay Preformed could take. One *non*-preformed rope lasted only a single day. The best *non*-preformed rope service "took it" for only ten days. But Tru-Lay Preformed stuck on the job for six weeks. Turned in a record of 520 working hours.

This is only one of literally thousands of instances of Tru-Lay Preformed superiority—accumulated over a period of ten years. Ask an American Cable rope engineer to show you Tru-Lay performance records on the kind of machine *you* operate.

AMERICAN CABLE COMPANY, Inc.

Wilkes-Barre, Pennsylvania

An Associate Company of the American Chain Company, Inc.

In Business for Your Safety

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ACCO

TRU·LAY *Preformed* Wire Rope